ACCUSHOT™

GIVE EVERY SEED ITS BEST SHOT

Operator and Maintenance Manual

Great Plains
"Harvest Starts Here."

CapstanAG

115700-001 Rev. B

SERVICE CONTACT INFORMATION

If a problem arises with the AccuShot™ System that cannot be corrected with the information in this manual, please contact your dealer for service and technical assistance.

Dealer: _____

Contact: _____

Phone: _____

Address: _____

City / State / Zip: _____

CONTENTS

THIS PAGE IS INTENTIONALLY LEFT BLANK

1.0 - INTRODUCTION

The AccuShot liquid delivery system is designed to apply a specific amount of liquid product at a specific location relative to each seed in the furrow. The correct amount of liquid product can now be delivered where the seed needs it...giving each seed a better shot at germination.

Application Based

To reduce seed burn and improve stand counts, the operator supplies initial setup information via a VT display so AccuShot can determine how close to the seed to apply the liquid product. By concentrating the liquid product where the seed needs it, AccuShot reduces the amount of liquid product used between the seeds at wider seed spacings.

Results

Improved plant vigor and less liquid product used both drive more profit to the producer's bottom line with AccuShot.

Other Manuals

The AccuShot Operator and Maintenance Manual is for use with other manuals provided with tractors, planters and other ancillary equipment. These can be obtained from the manufacturer's respective website.

AccuShot™ is a trademark of Great Plains Ag.

AccuShot™ may be covered by one or more of U.S. Patents. For more information, visit www.BlendedPulse.com.

THIS PAGE IS INTENTIONALLY LEFT BLANK

2.0 - SAFETY

2.1 - Hazard Communications

This manual contains important information on how to safely, efficiently and correctly operate and maintain the CapstanAG equipment. Following these instructions will help keep personnel safe, reduce downtime and increase the reliability and life of the equipment, its components and related systems.

- Review the Safety Information in the OEM Agricultural equipment manual(s).
- Follow the instructions (in this manual) for each step thoroughly to ensure safe work conditions in and around OEM Agricultural equipment.
- It is important for all individuals working with chemicals to understand the potential risks, necessary safety precautions, and proper response in the event of accidental contact.
- Review the OEM Agricultural equipment manual(s) for chemical safety information.
- Review, understand and read procedures and use Safety Data Sheets (SDS) and the required PPE for hazardous chemicals.

Make certain that all personnel have read this manual and thoroughly understand safe and correct operation and maintenance procedures.

Please keep this manual and all enclosed documentation in an accessible location known to all operators, installation, and maintenance personnel.

If you do not understand the CapstanAG equipment after reading this manual, please obtain the proper training before working with equipment to ensure your own safety and well as your co-worker's safety.

- Do not attempt to operate any equipment or system until you completely understand why, when and how it operates. If you are uncertain after studying this manual, please contact CapstanAG.

CapstanAG
4225 SW Kirklawn Ave.
Topeka, KS 66609
Headquarters: (785) 232-4477
Toll-free: (855) 628-7722
Fax: (785) 232-7799
E-mail: prodsupport@capstanag.com

2.2 - Signal Words

Signal Words used in product safety messages (found in this manual) are based upon these Standards:

- American National Standards Institute (ANSI) Z535.1-6
- American Society of Agricultural and Biological Engineers (ASABE) MS-23/14

2.3 - Definitions

The **DANGER** symbol indicates a hazardous situation, which if not avoided, will result in death or serious injury. This signal word is limited to extreme situations.

The **WARNING** symbol indicates a hazardous situation, which if not avoided, could result in serious injury or equipment damage.

NOTE: DANGER or WARNING signal words are not used for property damage accidents unless personal injury risk is appropriate to a specific hazardous situation level.

The ***NOTICE*** symbol addresses practices not related to personal injury and safety practices.

The **SAFETY INSTRUCTION** symbol explains safety practices and hazardous situations in detail, above what the **DANGER** and **WARNING** symbols can provide.

2.4 - Conformance

Safety Messages in this CapstanAG manual conforms to the ANSI Z535 Standard:

- **Safety Color Code: (WARNING)**
- **Signal Word:** WARNING!
- **Hazard Statement:** Chemical residues may be present in the OEM equipment.
- **Instructions Statement:** Release pressure on the liquid application system before servicing. Rinse the system with clean water prior to installing or servicing fittings, hoses, valves, or nozzles.
- **Consequences Statement:** Use proper PPE at all times to avoid personal injury.

2.5 - HCS Pictograms and GHS Safety Labels

OSHA's Hazard Communication Standard (HCS) places pictograms on labels to alert users of chemical hazard exposure **[Figure 1]**. You may find these pictograms on OEM Agricultural equipment. Review the OEM Agricultural manuals for further explanations on these pictograms.

Figure 1

The HCS aligned its provisions with the United Nations' Globally Harmonized System (GHS) Classification and Labeling of Chemicals in 2012. **[Figure 2]** displays a GHS Safety Label example for a chemical hazard.

Figure 2

CapstanAG add-on application systems for OEM and retrofit Agricultural equipment may contain (where applicable) HCS pictograms and GHS safety labels (on our equipment) and safety "signal word" messages (in this manual) **[Figure 3]**.

These labels and safety messages warn all personnel about hazardous chemicals or potentially unsafe chemical conditions that may exist while working around Agricultural equipment.

Figure 3

2.6 - Hazardous Energy

People working around OEM Agricultural Equipment may be exposed to hazardous energy in several forms and combinations during installation, operation or maintenance, of CapstanAG equipment, such as:

- Kinetic (mechanical) - energy in the moving parts of mechanical systems (springs or spring-loaded).
- Potential (residual) - energy stored in pressure vessels, such as liquid application systems and hydraulic cylinders and hoses.
- Electrical energy - generated electrical power, static sources, or electrical storage devices (such as batteries or capacitors).
- Thermal (high or low temperature) - energy resulting from mechanical work, radiation, chemical reaction, or electrical resistance.

2.7 - Chemical Safety

Following these common handling practices for working safely around hazardous chemicals:

- Always have an ample water supply nearby.
- Never smoke or eat while working around chemical spraying equipment.
- Have qualified technicians that are familiar with all local, State or Province, and Country-specific laws install and service the equipment.
- Operate the equipment according to the Product, Operation or Maintenance Manual.
- Avoid chemical exposure by using the proper PPE. Remove contaminated clothing immediately and wash skin (and clothing) thoroughly with soap and water. Wash contaminated clothing after every use.
- Bleed off pressurized application equipment and flush the chemical residue with clean water before servicing.
- If symptoms of illness occur during or shortly after working on or around agricultural equipment, immediately call a physician or go to a hospital.

2.8 - Unsafe Equipment Use

- The use of the CapstanAG product application systems by non-qualified personnel.
- The use of unsuitable tools or replacing components or spare parts with ones other than those specified in this manual or by CapstanAG personnel.
- Re-engineering CapstanAG's operating software so it changes the intended use of the CapstanAG equipment without FIRST consulting CapstanAG.

2.9 - Battery Safety

Use the procedure in the appropriate Agricultural Equipment Manual for connecting, disconnecting and jump starting the machine's battery.

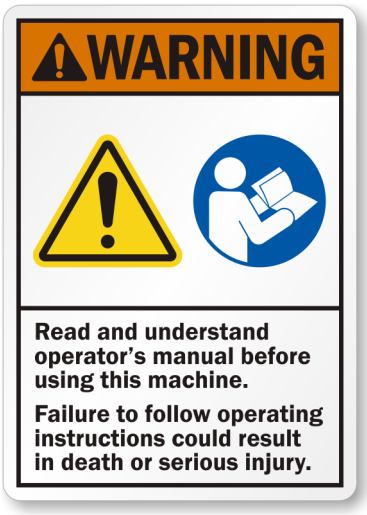
- Keep sparks and flames away from the battery. Battery gas can explode and cause serious injury. Do not smoke in battery charging area.
- Remove jewelry, which might make electrical contact and create sparks.
- Avoid chemical burns by not rubbing eyes or skin while working with the battery.
- Wash your hands immediately after completing the job.

2.10 - Extinguishing Fires

Fire extinguishing systems must meet the applicable OSHA requirements and all users of Portable/Fixed Fire Suppression Equipment must know the types, limitations, and proper uses of this equipment; including hazards involved with incipient stage firefighting.

Know where fire extinguishers and first aid kits are located and how to use them.

- Inspect the fire extinguisher and service the fire extinguisher regularly.
- Follow the recommendations on the instructions plate.
- Very small fires can be put out (extinguished) with a fire extinguisher. Use an appropriate method to extinguish a fire (water for paper fires, and chemical extinguishers for electrical or chemical fires.



THIS PAGE IS INTENTIONALLY LEFT BLANK

3.0 - SETUP

3.1 - System Description

[Figure 4] - AccuShot is a liquid delivery system designed to apply a specific amount of liquid product at a specific location relative to each seed's location in the furrow.

- The operator can decide how close to the seed to apply any liquid product, reducing seed burn and improving stand counts.
- By concentrating the liquid product near the seed, the seed receives a better response from the liquid product while reducing the amount of liquid used between the seeds.
- Improved plant vigor and less liquid product used drives profit to Producer's bottom line.

AccuShot works when a seed passes the seed tube sensor. Once seed is sensed, the correct amount of liquid is applied into the furrow using CapstanAG's nozzle valve.

DICKEY-john VT Display

The DICKEY-john AI-120 VT display is the main user interface and provides an all-in-one control for planting, spraying, and spreading applications. The AI-120 VT display interacts with the GPS and electronic control devices centralizing the ability to communicate, record, store, and display data.

The VT-compatible operation includes a touch screen display in the tractor cab to access the AccuShot system. On-screen navigation involves applying and removing finger pressure on the touch screen icons, scroll bars, and selectable options/windows to complete a desired operation.

[Figure 5] - Touch the **ACCUSHOT** icon on the left side of the AI-120 VT display to open the AccuShot system to the **HOME** Screen.

NOTE: The DICKEY-john AI-100 VT display is also a compatible display for the AccuShot system.

NOTE: For ease in viewing the VT display throughout this manual, the images will only show a larger screen image of the AccuShot screen menus without the display case.

Figure 4

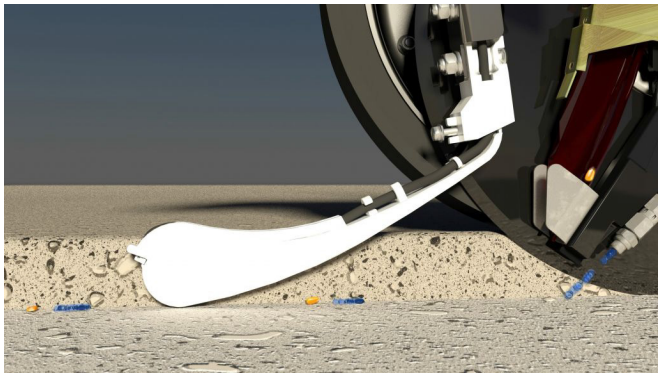


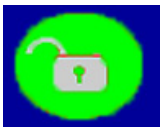
Figure 5

3.2 - Monitor Selection

NOTE: If there are two or more monitors on the same CAN, select the desired monitor to be used to view the AccuShot information.

Icon	Description

NOTE: Selection of the monitor is done by unlocking the screen.



[Figure 6] - On the Sensor settings screen, touch the **LOCK** icon to open the on-screen keyboard. Type in the password and touch the key to enter the password and **UNLOCK** the screen.
The switch monitor icon will appear in the RH menu.

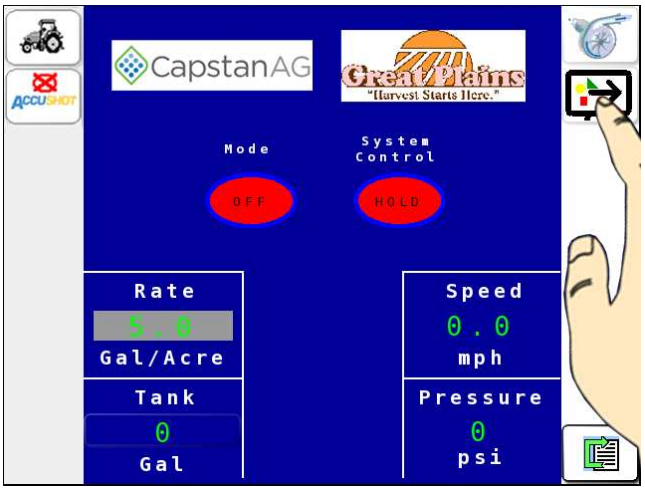
Icon	Description

[Figure 7] - Touch the **SWITCH MONITOR** icon to select monitor.

You will be prompted to *Accept or Cancel*.

Figure 6

Figure 7



3.3 - Icon Descriptions

Icon	Icon Descriptions - LH Side of AccuShot Screen
	When the AccuShot system is OFF a red X will be above the AccuShot logo. Touch this icon to activate the AccuShot system.
	When the AccuShot system is in any Mode other than OFF, a green check mark will be above the AccuShot logo.
Icon	**Icon Descriptions - RH Side of AccuShot Screen**
	The **ALARM** icon appears when there is an alarm in the system. Touch this icon to view and silence current alarms.
	Touch this icon to return to the **HOME** Screen.
	Touch this icon to open the **PLACEMENT SETTINGS** Screen.
	Touch this icon to open the **TIP CALIBRATION** Screen.
	Touch this icon to open the **DIAGNOSTICS** Screen.
	Touch this icon to open the **TANK VOLUME** Screen.
	Touch this icon to open the **ACTIVE SEED VALVE SENSOR** Screen.
	Touch this icon to “go to” the **Next Page** of icons.
	Touch this icon to open the **SENSOR SETTINGS** Screen.
	Touch this icon to open the **PUMP SETTINGS** Screen.
	This icon only shows when there are two or more monitors on the same CAN, after unlocking the screen with the correct password. Touch this icon to **SWITCH MONITORS**.

Icon	Icon Descriptions - RH Side of AccuShot Screen with an active Alarm
	Scroll up to view alarms if more than one is active.
	Touching **X** will only silence the alarm, it will not clear the alarm.
	Scroll down to view alarms if more than one is active.

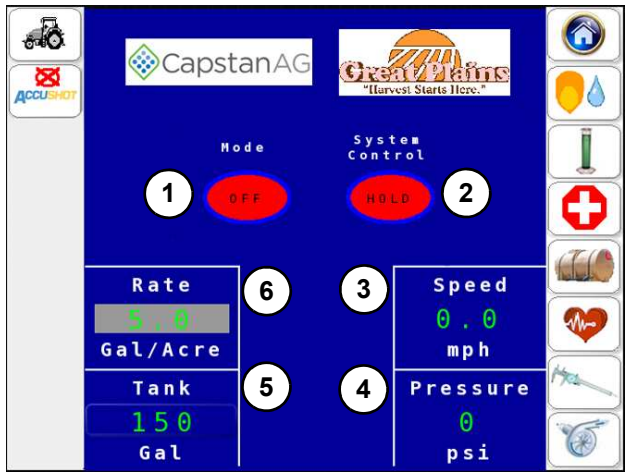
3.4 - HOME Screen

[Figure 8] - The **HOME** Screen is the main user interface that provides central control of the AccuShot system.

Icon	Description
	Touch the **HOME** icon to view Ground Speed (3), System Pressure (4), Tank Volume (5) and Rate values (6) on the **HOME** Screen. (1) Touch and toggle **MODE** to select, AUTO | MAN | OPEN | OFF. (2) Touch and toggle **SYSTEM CONTROL** to select RUN | HOLD functions.

NOTE: As a safety feature, to protect the pump from unexpectedly ramping up or the nozzle valves firing incorrectly, the pump will automatically shut off when switching between modes.

Figure 8



3.5 - PLACEMENT Settings

[Figure 9] - Use the **PLACEMENT SETTINGS** Screen to enter / edit the placement and location of the shot in relation to the location of the seed.

Icon	Description
	**[Figure 9] -** Touch the **SEED/ DROPLET** icon to set Population, Number of Planter Row Units, Planter Width, Application Rate, System Pressure, Target Speed, and Shot Distance from the seed.

Settings	Defaults	Units of Measure
Population	32.0	Thousand (K) Seed per Acre
Number of Row Units	32	
Planter Width	480	Inch
Application Rate	5.0	Gallon per Acre
Pressure Set Point	30.0	PSI
Target Speed	5.0	MPH
Dist. From Seed	1.0	Inch

NOTE: [Figure 10] - A warning will appear on the **PLACEMENT SETTINGS** Screen when Operator-entered values may not match or align with other settings. Read the warning and touch **ACCEPT** or **CANCEL** to continue.

Figure 9

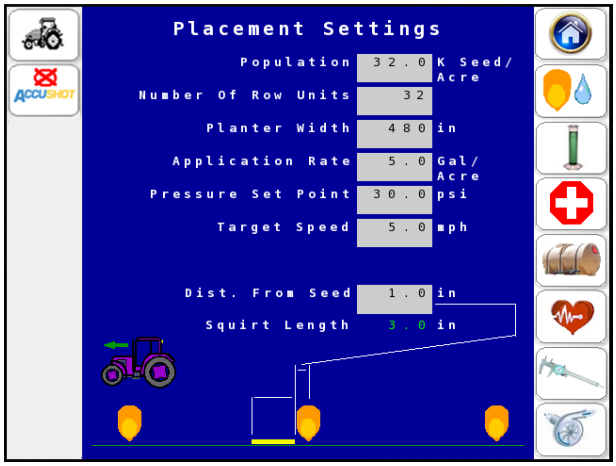
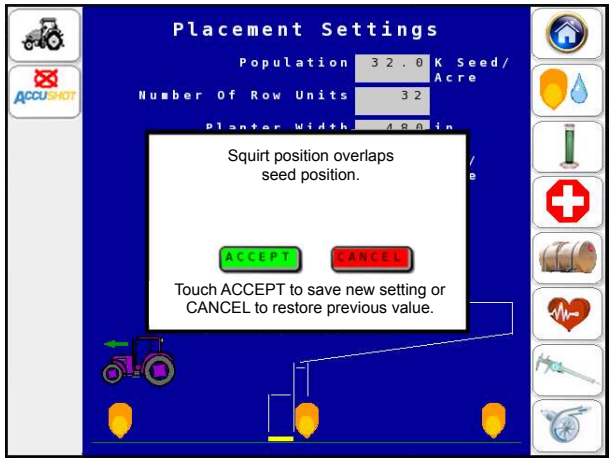


Figure 10



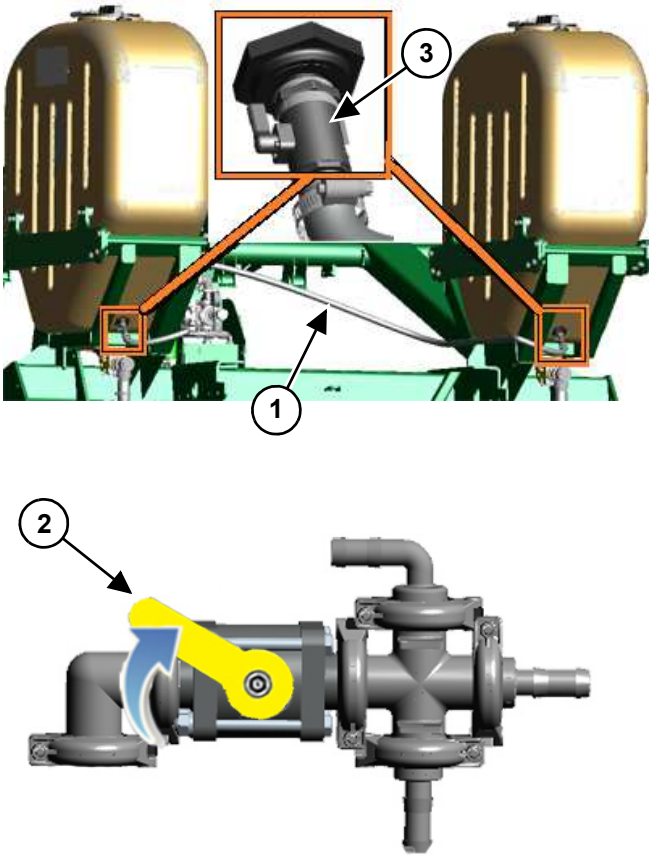
3.6 - Procedure for Setting Liquid Bypass for AccuShot

[Figure 11] - When the add-on hydraulically-driven centrifugal pump must run at different operating points on the AccuShot system, a liquid product bypass line(s) (1) is (are) used to return some of the liquid back to the liquid product tank(s). This lets the pump to operate efficiently and reliably at its best efficiency point. If the pumped liquid product was returned through the suction line connections, turbulences at the pump suction would cause operational problems and even equipment damage.

AccuShot uses a Main Bypass Valve (2) near the product pump and a Liquid Product Shuttoff Valve (3) on the lower backside of each liquid product tank to manage different operating points. A total of up to 5.5 GPM of hydraulic flow is needed to operate the AccuShot system.

NOTE: Minor hydraulic pump adjustment might be required when planting. **See 3.12 - PUMP Settings on page 30** for making any needed adjustments.

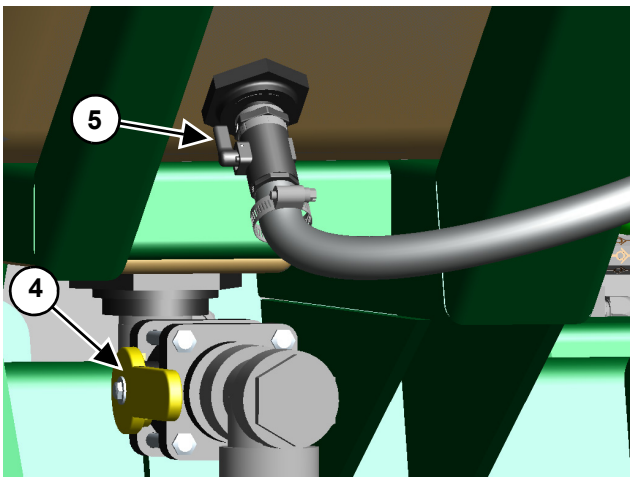
Figure 11



3.6.1 - Initial Setup

1. Fill liquid product tank(s).
2. **[Figure 12] -** Make sure that the Tank Supply Valve(s) (4) is/are open.
3. Make sure that the Liquid Product Shutoff Valve(s) (5), being used for AccuShot, is/are open on the back of the liquid product tank(s).

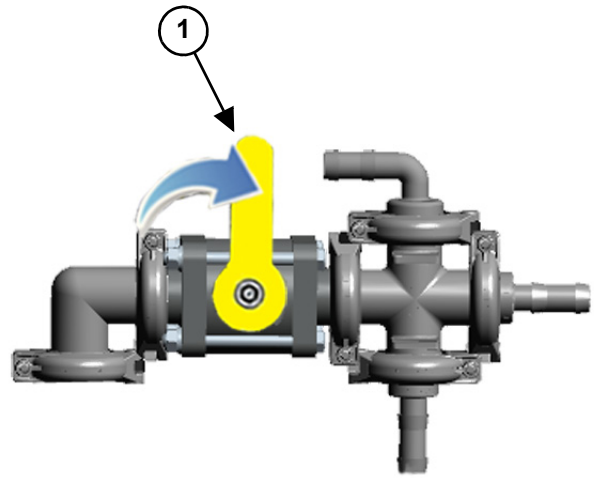
Figure 12



3.6.2 - Close Main Bypass Valve

4. **[Figure 13] -** Close the main bypass valve (1) (near the product pump) on the planter.

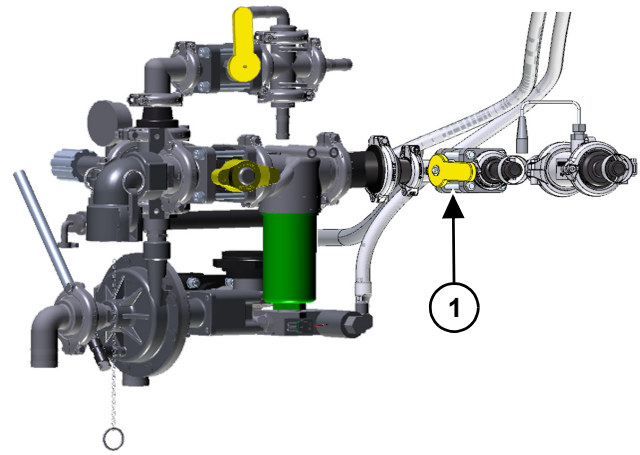
Figure 13



3.6.3 - Open Boom Shutoff Valve

5. **[Figure 14] -** Open shutoff valve (1) to booms on product line.
6. Start the tractor.
7. Engage the planter hydraulics.

Figure 14

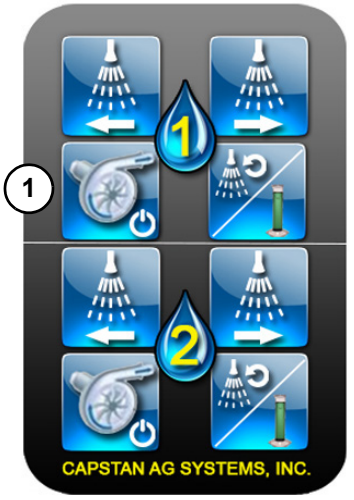


3.6.4 - Activate Pump

Icon	Description
	Touch the red **DIAGNOSTICS** icon on the right hand side of the **HOME** Screen.

8. **[Figure 15] -** Touch the red **KEY FOB MODE** icon on the **DIAGNOSTIC** Screen (the icon will turn green and the function icons will appear).

9. **[Figure 16] -** Start the liquid product pump by touching the pump **ON/OFF** icon on the **DIAGNOSTIC** Screen or by pressing the button (1) on the Key FOB.



3.6.5 - Pressure Relief Valve Adjustment

10. While viewing the manual pressure gauge (1) at the liquid product pump, adjust the pressure relief valve (2) to set the pressure at 70 PSI maximum.

    Rotate counter clockwise to decrease pressure.

    Rotate clockwise to increase pressure.

11. Once the pressure is set, use the locknut to lock the setting in place.

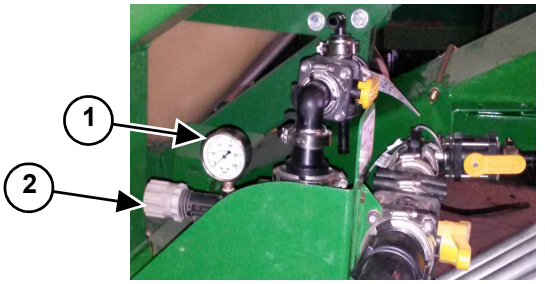
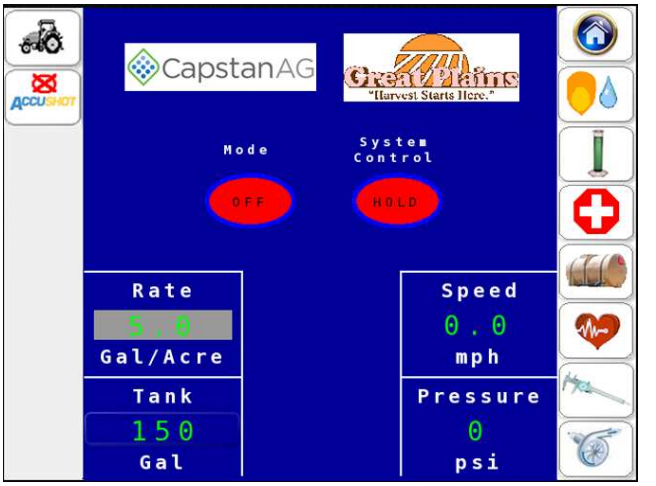


Figure 15



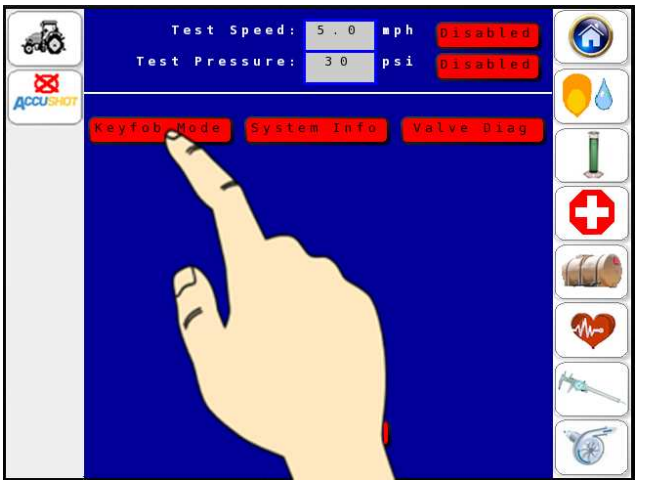
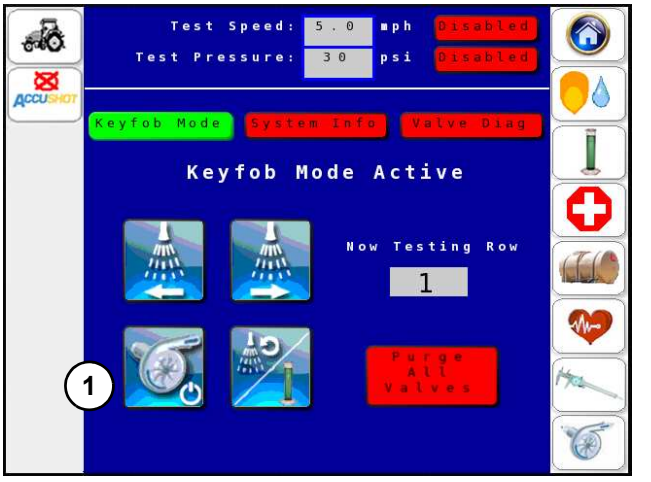


Figure 16



3.6.6 - Set Max System Pressure

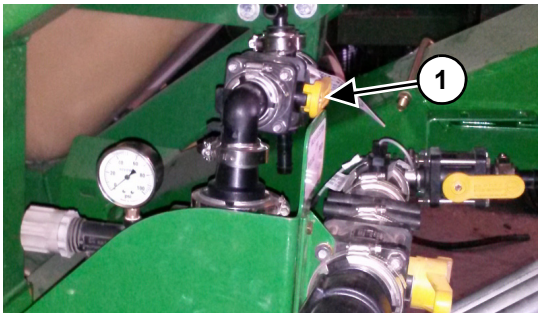
12. **[Figure 17] -** Open the main bypass to the 10 o'clock position.

13. **[Figure 18] -** While viewing the manual pressure gauge on the planter, make sure that the pressure is 60 PSI. If not 60 PSI, do these steps:

    a. Under 60 PSI

        i. **Increase** the hydraulic flow to the planter hydraulics until 60 PSI is reached on the manual pressure gauge on the planter.

            1. If the hydraulics cannot get the pressure to 60 PSI, close the main bypass valve (1) until pressure reaches 60 PSI. (Some bypass is needed for better AccuShot operation.)



            2. If the pressure does not reach 60 PSI with the main bypass fully closed, the tractor hydraulic supply is not sufficient. Contact your planter dealer for further assistance.

    b. Above 60 PSI

        i. **Decrease** the hydraulic flow to the planter hydraulics until 60 PSI is reached on the manual pressure gauge on the planter.

14. **[Figure 19] -** Shut off the product pump by touching the pump on/off icon on the screen or Key FOB.

15. The bypass valve should be set at the correct pressure and flow after performing the above steps. Recheck the pressure gauge on the planter to verify.

NOTE: Minor hydraulic pump adjustment might be required when planting. **See 3.12 - PUMP Settings on page 30**.

Figure 17

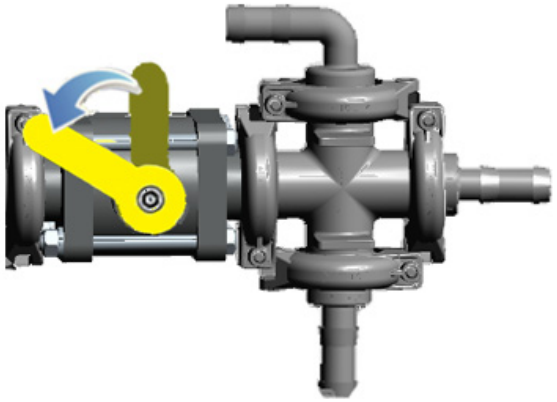


Figure 18

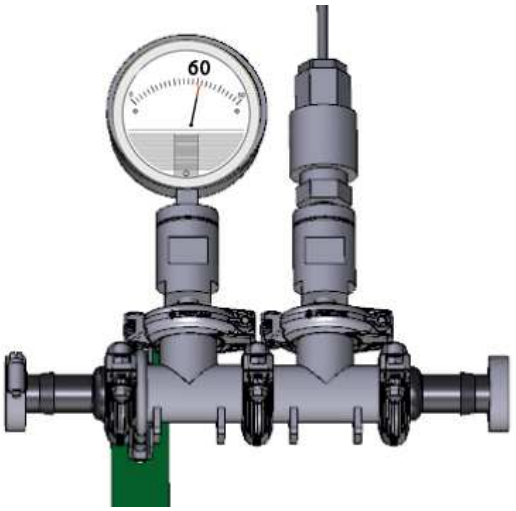


Figure 19

3.7 - DIAGNOSTICS

Icon	Description
	**[Figure 20]** - Touch the red **DIAGNOSTICS** icon to view the **DIAGNOSTIC** Screen.

[Figure 21] - The Operator can perform the following functions on the **DIAGNOSTIC** Screen:

1. Enable Test Speed and/or Test Pressure for diagnostics and troubleshooting.
2. Activate Key FOB operation.
3. View System Info.
4. Run valve diagnostics.
5. View Alarm Logs.

Procedure

[Figure 21] - Touch to toggle any of the red icons on the **DIAGNOSTIC** Screen. The toggled icon will turn green when activated.

[Figure 22] - When a Test Speed and/or Test Pressure procedure is enabled for troubleshooting and diagnostics, “TEST” will blink on these two menu screens:

- **HOME** Screen in the center of the Speed and/or Pressure display boxes.
- **TIP CALIBRATION** Screen in the System Pressure box at the bottom of the screen.

[Figure 23] - Both Test Speed and Test Pressure values can be edited (one at a time) from the **DIAGNOSTIC** Screen, by touching inside the value display box to activate the keypad. Once a number is selected, touch the  key to enter the chosen number.

Figure 20

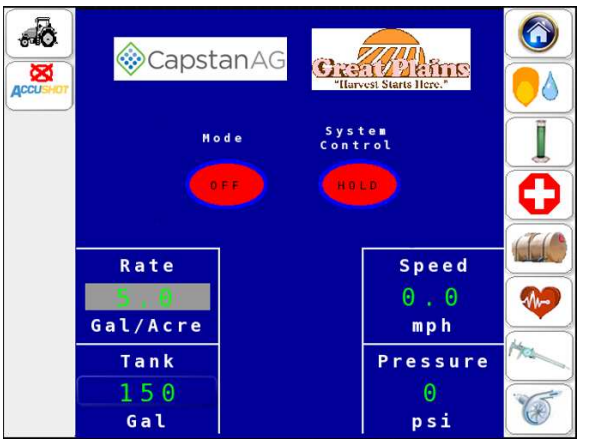


Figure 21

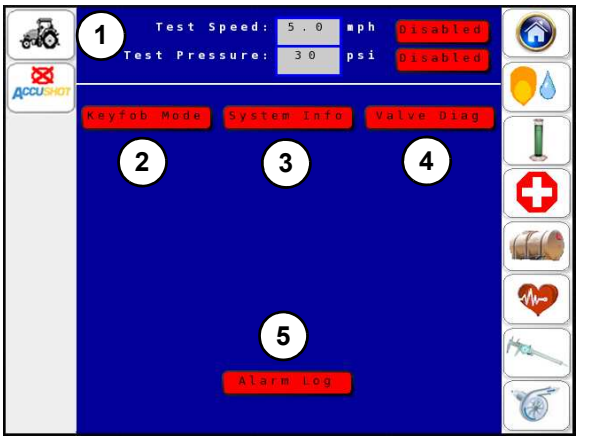


Figure 22

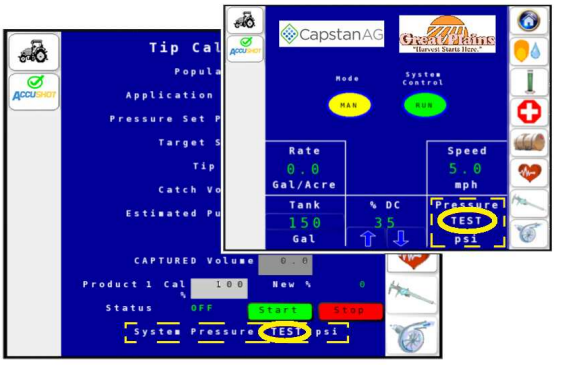
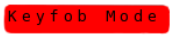


Figure 23

3.7.1 - Activate the Key FOB Controls

Icon	Description
	Touch the red **DIAGNOSTICS** icon.

Procedure	
	**[Figure 24] -** Touch the red **KEY FOB MODE** icon on the **DIAGNOSTIC** Screen to display the Key FOB function icons.
	**[Figure 24] -** Key FOB Mode Active will blink on the **DIAGNOSTIC** Screen and the red icon will turn green.

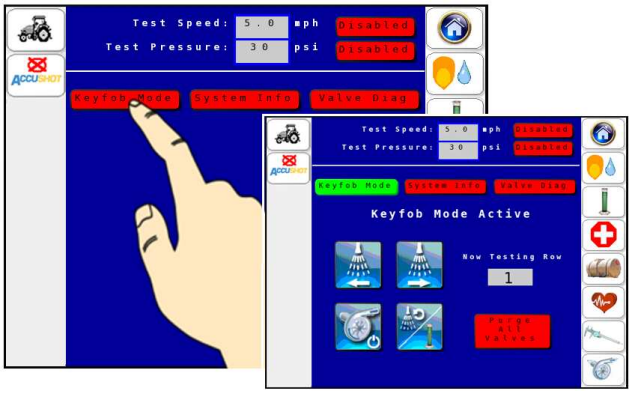
3.7.2 - Operate the Key FOB Controls

Icon	Description
(1)	Pulse Nozzles Right to Left.
(2)	Turn Pump ON/OFF.
(3)	Pulse Nozzles Left to Right.
(4)	Repeat Current Nozzle Pulse.
	NOTE: [Figure 25] - Button (4) has a dual function. During Tip Calibration, it is used to Start/Stop the calibration catch test.

Procedure	
The operator can also use the Key FOB or the AccuShot screen in the cab to clear any plugged rows, remove air from the system, and test row-by-row to ensure that all rows are still working properly.	
	The row number being tested can be edited from the **DIAGNOSTIC** Screen with Key FOB Controls activated.
	**[Figure 26]** - Touch the inside of the “Now Testing Row” display box to enable the keypad. Touch / edit the row number being tested. Touch the  key to enter the value.

NOTE: If the **MODE** is not set to **OFF** on the **HOME** Screen, a warning will appear when enabling **KEY FOB MODE**.

Figure 24



NOTE: The bottom four buttons on the Key FOB are used with a second product.

Figure 25

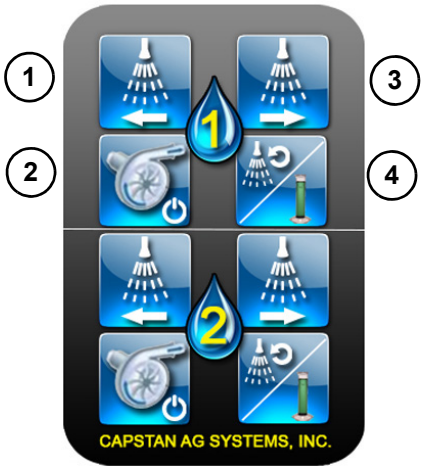


Figure 26

3.7.3 - Purge Operation

[Figure 27] - The operator can prime, purge the air, or flush the AccuShot plumbing system from the **DIAGNOSTIC** Screen with the Key FOB Mode activated.

NOTE: At the start of every planting day, an operator should (at the very least) run the Purge All Valves operation to check the system for air or contamination.

Icon	Description
	To perform the Purge Operation, the VT display must be on the **DIAGNOSTIC** Screen with no active warnings. (Read / Review section 3.4 on page 21 if needed).
	**[Figure 28] -** Make sure that the Key FOB Controls are activated and displays a green **KEY FOB MODE** icon. (Read / Review 3.7.1 - Activate the Key FOB Controls on page 21 if needed).
Procedure	
	**[Figure 27] -** Touch the red **PURGE ALL VALVES** icon to start purge operation.
	**[Figure 28] -** The red **PURGE ALL VALVES** icon will turn green and all nozzle valves will open 100%, allowing a constant liquid flow from the product tank, through the plumbing system and discharging through the nozzle valves.

NOTE: Purge will end when touching the green **PURGING VALVES** icon, pressing any of the top 4 Key FOB buttons, touching the **KEY FOB** icons on the **DIAGNOSTIC** Screen, or leaving the **KEY FOB MODE** Screen.

Figure 27

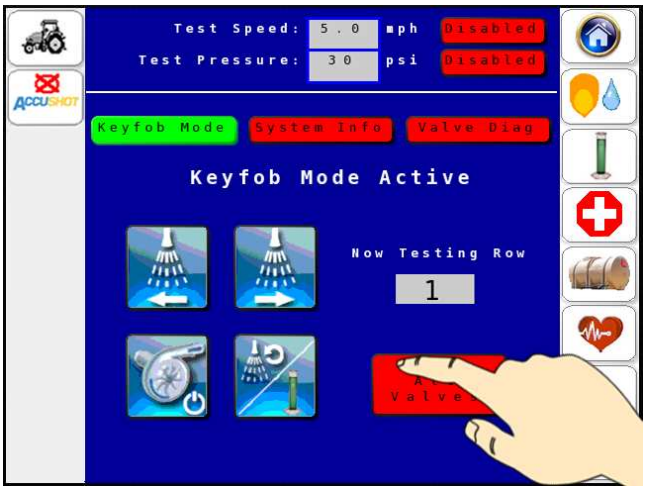
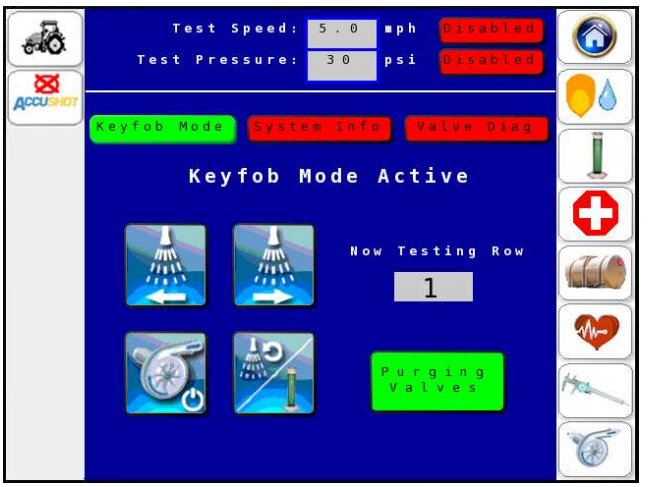


Figure 28



3.7.4 - Operate the System Info Screen

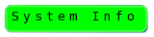
Icon	Description
	**[Figure 29] -** Touch the **SYSTEM INFO** icon on the **DIAGNOSTIC** Screen to display more information. The icon will turn green when enabled. The operator can view System Voltage, Hour Meter, Pressure Sensor Voltage, Pump Duty Cycle, GPS readouts, Row Unit status, and Wifi information.
	
	**[Figure 30] -** Touch the **SW VERSIONS** icon to view the AccuShot controller's circuit board information.

Figure 29

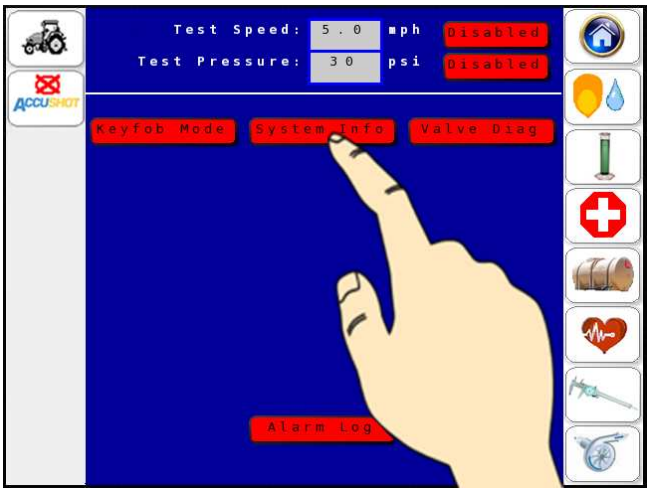
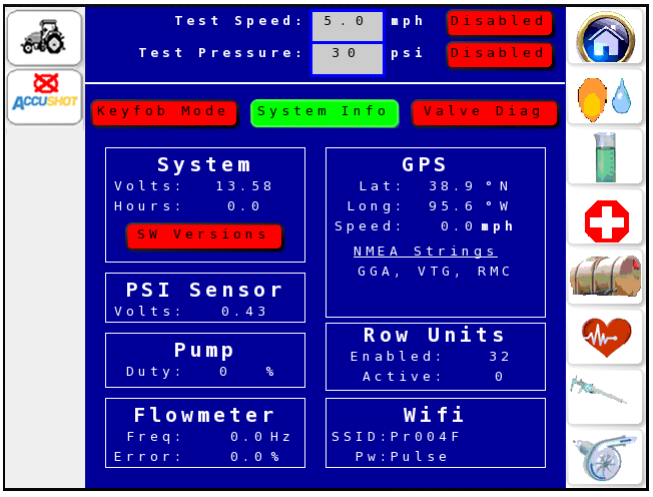
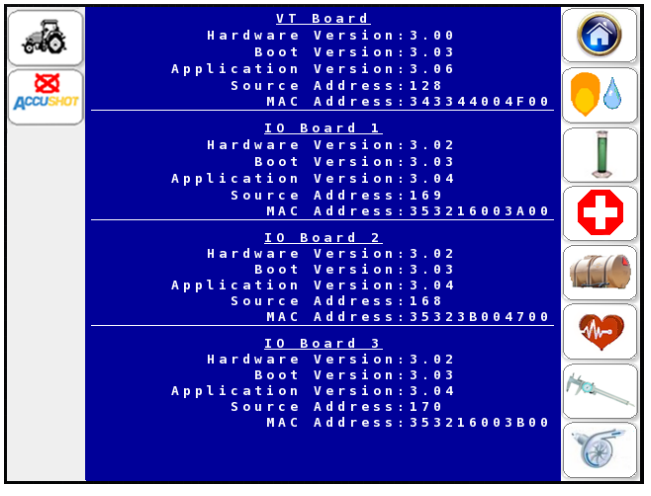


Figure 30



Circuit Board Information



3.7.5 - Valve Diagnostics

Icon	Description
	Touch the red **DIAGNOSTICS** icon on the **HOME** Screen.
 	**[Figure 31] -** Touch the **Valve DIAG** icon. The icon will turn green. The operator can see if all nozzle valves and seed sensors are connected.

Icon	Indicator Color Key
	Indicates seed sensors and nozzle valves are connected.
	Indicates nozzle valve is connected while seed sensor is not being detected by controller.
	Indicates seed sensor is connected while the nozzle valve is not being detected by controller.
	Indicates that rows are disabled or OFF. These rows will not operate.
	See Troubleshooting Chapter for more diagnostic help, if needed.

NOTE: **[Figure 32] -** If the **MODE** is not set to **OFF** on the **HOME** Screen, a warning will appear when enabling Valve Diagnostics.

Figure 31

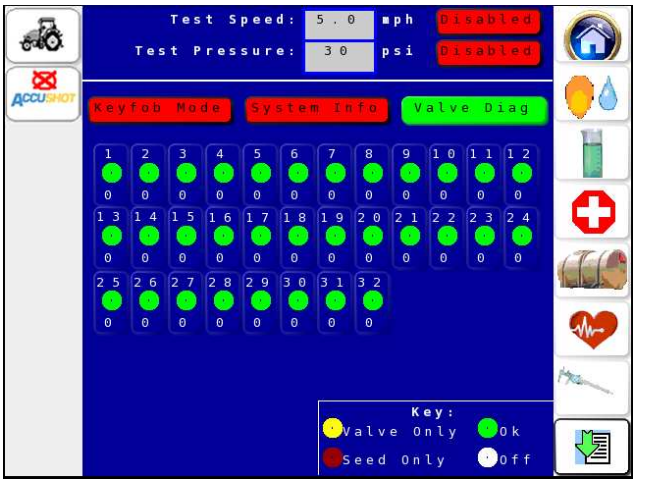
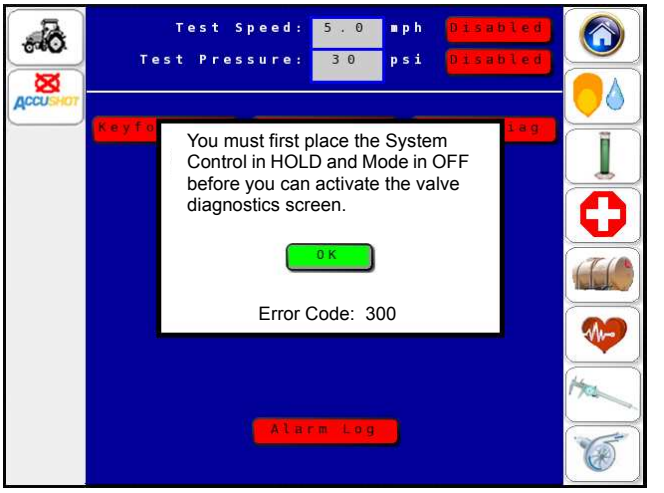
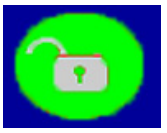


Figure 32



3.8 - Row Disable Function

NOTE: To disable rows, the operator must go to the **SENSOR SETTINGS** Screen or the **PUMP SETTINGS** Screen to unlock the system.

Icon	Description
 	**[Figure 33]** - Touch the **LOCK** icon to open the on-screen keyboard. Type in the password and touch the  key to enter the password and **UNLOCK** the screen. (If needed, contact your local dealer for password help.)
	Touch the red **DIAGNOSTICS** icon.
	**[Figure 34] -** Touch the **Valve DIAG** icon. The icon will turn green.

The Operator can see if all nozzle valves and seed sensors are connected.

[Figure 35] - The Unlocked screen allows the operator to disable rows.

Figure 33

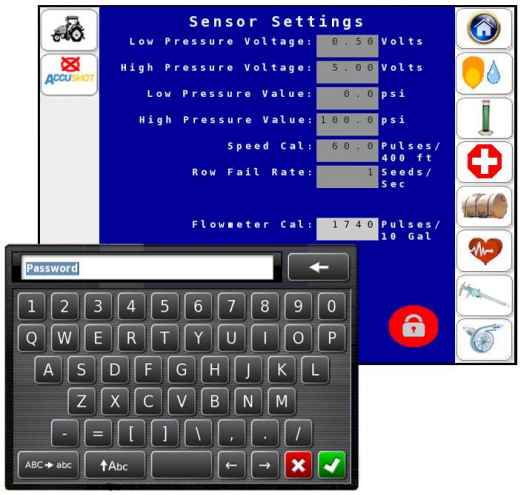


Figure 34

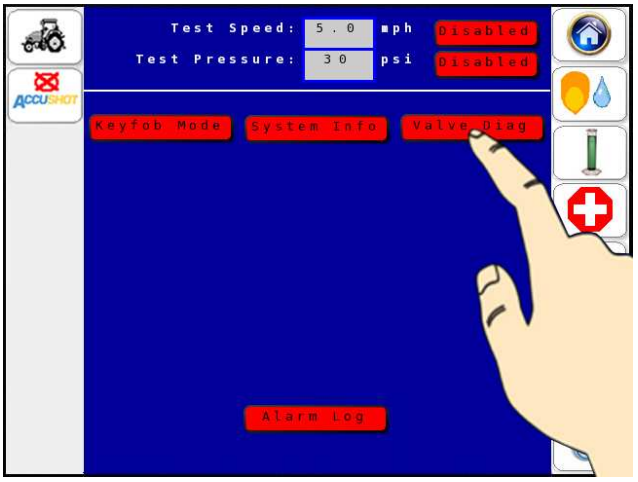
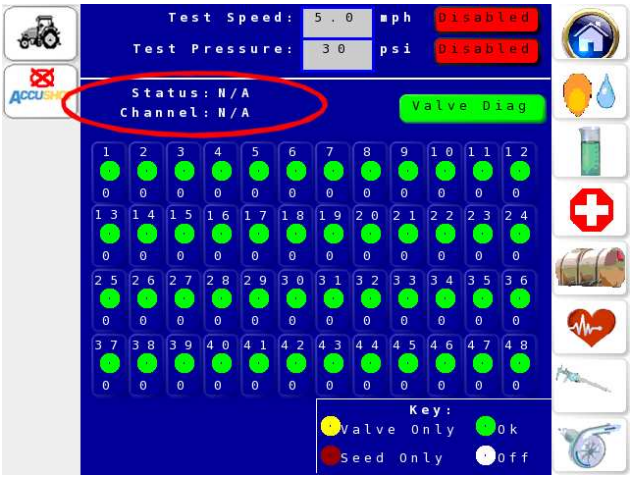


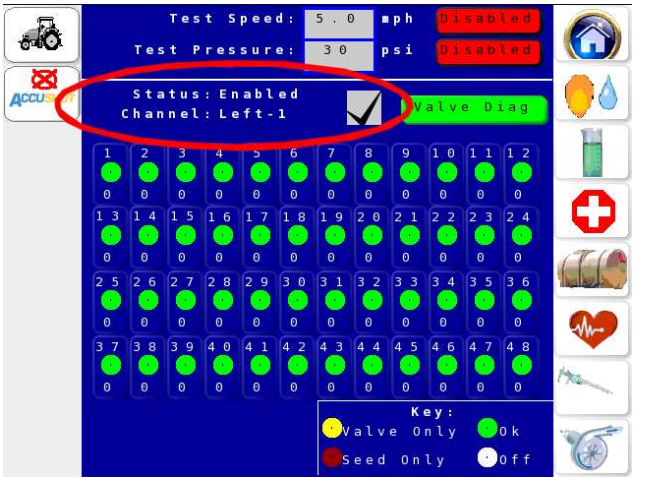
Figure 35



[Figure 36] - Touch the desired row  .

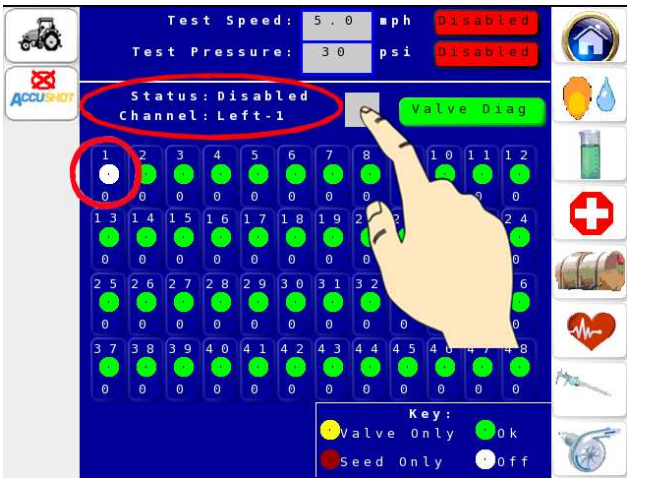
- Status: will read Enabled or Disabled.
- Channel: will display the channel and board selected.

Figure 36



[Figure 37] - If the box is unchecked (row disabled) the green dot will turn white (OFF) and the status for that row will read “Disabled”.

Figure 37



3.9 - TIP CALIBRATION Catch Test

Icon	Description
	The **TIP CALIBRATION** Screen is used to compensate for different viscosities and fluid dynamics

Procedure

1. Touch the **TIP CALIBRATION** icon on the **HOME** Screen.
2. Verify and edit Tip Calibration information as needed. Changing values on the **TIP CALIBRATION** Screen will also change the same values in the **PLACEMENT SETTINGS** Screen or vice versa.

NOTE: Verify that the Tip Size is correct.

Spray Tip size is verified by looking at the outside surface of the tip near the spray end.

3. **[Figure 39] -** Place the Calibration Pitcher directly underneath the spray nozzle on Row #1 of the Planter.
4. **[Figure 38] -** With the planter hydraulics engaged, touch the **START** icon on the **TIP CALIBRATION** Screen or press button 4 on the Key FOB to begin the tip calibration Catch Test.

NOTE: You can START and STOP testing as needed using the **TIP CALIBRATION** Screen or **KEY FOB**.

5. Once the test is complete and liquid product is captured:
   - **[Figure 40] -** Read the Calibration Pitcher at the bottom of the meniscus.

Figure 38

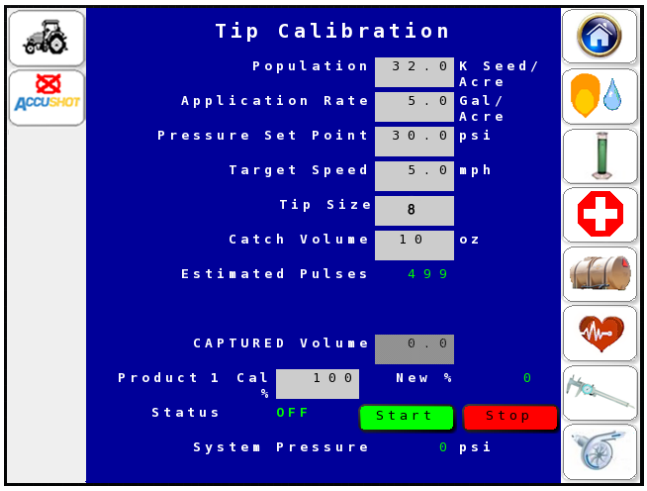


Figure 39

NOTE: Reading the Calibration Pitcher at or above the meniscus will cause an inaccurate GPA measurement.

Figure 40

Meniscus
The Meniscus is the curve in the upper surface of a liquid close to the surface of the container or another object, caused by surface tension. the curve can be either convex or concave, depending on the liquid and the surface.

Read the volume captured at the bottom of the meniscus.

6. **[Figure 41] -** Touch the inside of the CAPTURED Volume box. A keypad will appear. Enter amount of fluid caught. Touch the  key to enter the amount.

7. Once a CAPTURED Volume is entered, touch

or

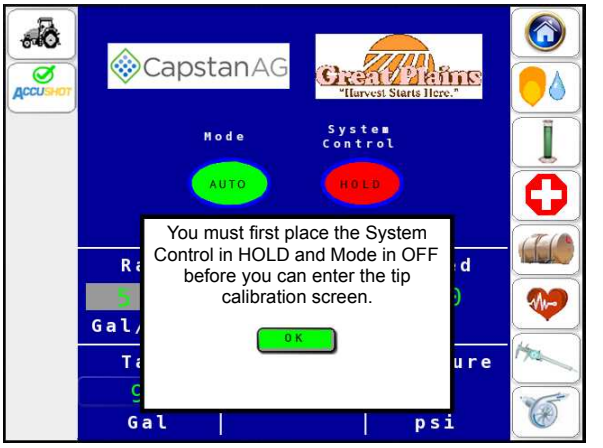
- A new Product 1 Cal% will be calculated. Touch **ACCEPT** to select new value or **DECLINE** to return to previous Product 1 Cal%.

8. Repeat Catch Test until the correct catch volume is caught.

Figure 41

NOTE: **[Figure 42] -** If the **MODE** is not set to **OFF** on the **HOME** Screen, a warning will appear when accessing the **TIP CALIBRATION** screen.

Figure 42



3.10 - TANK VOLUME

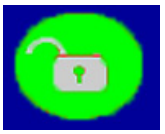
Icon	Description
	**[Figure 43] -** Touch the **TANK** icon to view and set the Tank Volume and set the Warning Level.
	Touching the Tank Volume Box on the **HOME** Screen opens the **TANK INVENTORY** Screen.

Figure 43

3.11 - SENSOR Settings

NOTE: All settings are locked on the **SENSOR SETTINGS** Screen except the Flowmeter Cal. Locked screens are intended only for qualified Service Technician access and use.

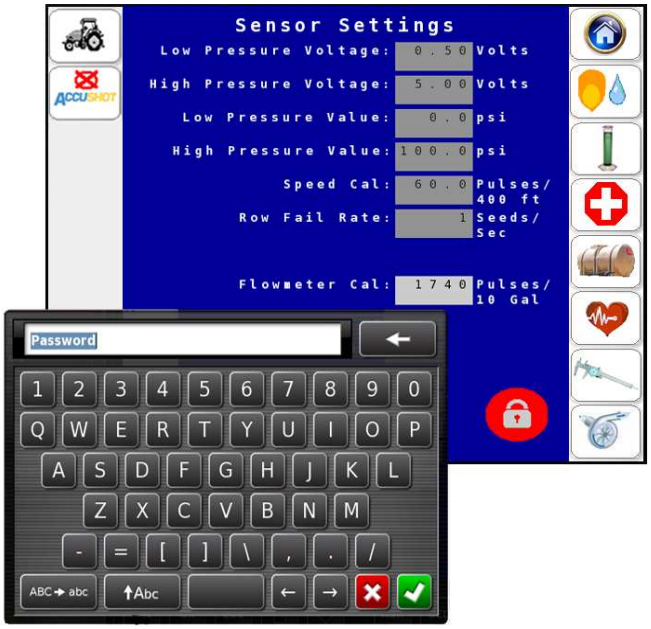
[Figure 44] - The Flowmeter Cal value entered must match the Flowmeter (label) on the planter. The Flowmeter Cal Value IS NOT locked and must be set by operator.

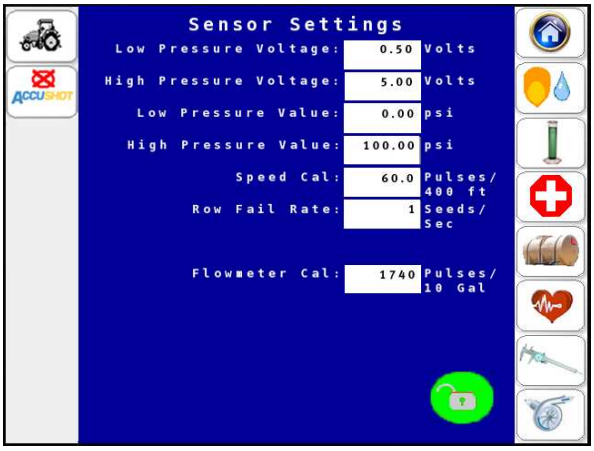
Icon	Description
	The default sensor settings are set at the factory.
 	**[Figure 45] -** Touch the **LOCK** icon to open the on-screen keyboard. Type in the password and touch the  key to enter the password and **UNLOCK** the screen. (If needed, contact your local dealer for password help.)

Settings	Default	Units of Measure
Pressure Sensor Voltage Low	0.5	VDC
Pressure Sensor Voltage High	5.0	VDC
Pressure Sensor Low	0.0	PSI
Pressure Sensor High	100	PSI
Speed Cal	60.0	Pulse per 400 ft.
Row Fail Rate	1	Seeds per Second
Flowmeter Cal	1740	Pulse per 10 Gals.

Figure 44

Figure 45





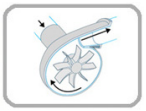
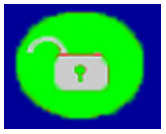
3.12 - PUMP Settings

NOTE: All settings are locked on the **PUMP SETTINGS** Screen. Locked screens are intended only for qualified Service Technician access and use.

Procedure After UNLOCK

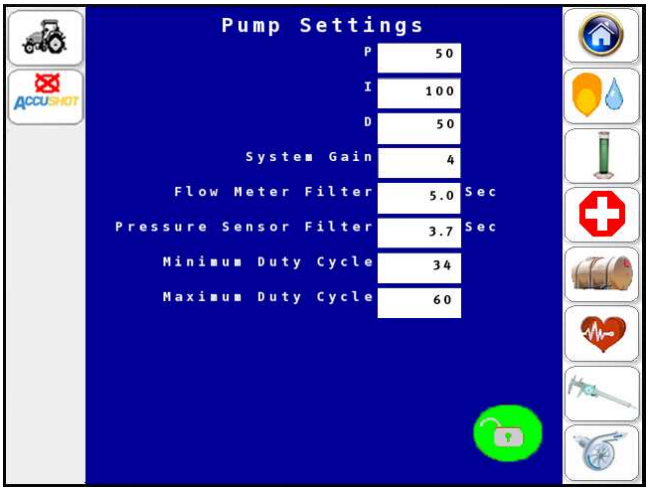
Adjust the hydraulic pump settings by using the System Gain setting to tune a system where the pressure is oscillating or sluggish to respond.

- Select a lower number **to stabilize** an oscillating system.
- Select a higher number **to speed up** a sluggish system.

Icon	Description
	The default pump settings are set at the factory.
	**[Figure 46] -** Touch the **LOCK** icon to open the on-screen keyboard. Type in the password and touch the  key to enter the password and **UNLOCK** the screen. (If needed, contact your local dealer for password help.)
	

Settings	Default	Units of Measure
P	50	N/A
I	100	N/A
D	50	N/A
System Gain	4	N/A
Flow Meter Filter	5.0	Sec.
Pressure Sensor Filter	3.7	Sec.
Min Duty Cycle	34	N/A
Max Duty Cycle	60	N/A

Figure 46



4.0 - FIELD OPERATION

4.1 - AUTO Mode

In **AUTO** Mode, the system automatically adjusts the pressure, and activates the nozzle valves when seeds are sensed. This mode should be used for normal field operation.

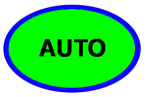
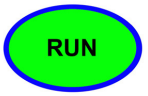
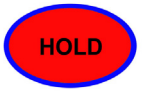
Icon	Description
	On the **HOME** Screen:
	**[Figure 47] -** Touch and toggle **MODE** icon to select **AUTO**.
	Touch and toggle **SYSTEM CONTROL** icon to select **RUN**. With the planter hydraulics engaged, the liquid product pump will engage and raise the pressure to the pressure set point.
	Touch and toggle **SYSTEM CONTROL** icon to select **HOLD**. The liquid product pump will disengage and nozzle valves will not pulse. **HOLD** is recommended when stopping to fill the planter with seed or liquid product.

Figure 47

4.2 - Procedures to Field Verify Seed and Shot Placement

A field check should be completed at the initial trip to the field and again whenever the distance to the seed is changed. To perform the seed and shot placement check, complete these steps:

1. **[Figure 48]** - On the AccuShot **HOME** Screen, touch and toggle **SYSTEM CONTROL** icon to select **HOLD**.
2. **[Figure 49]** - At the back of the planter, using tie-down straps (1), secure the closing wheels and shallow up the Side Gauge Wheel depth on the rows to be checked. (Recommend on a twin row to perform check procedures on rows next to each other. i.e. row 1 and 2).

Figure 48

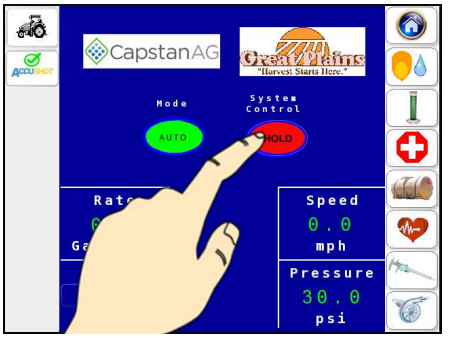
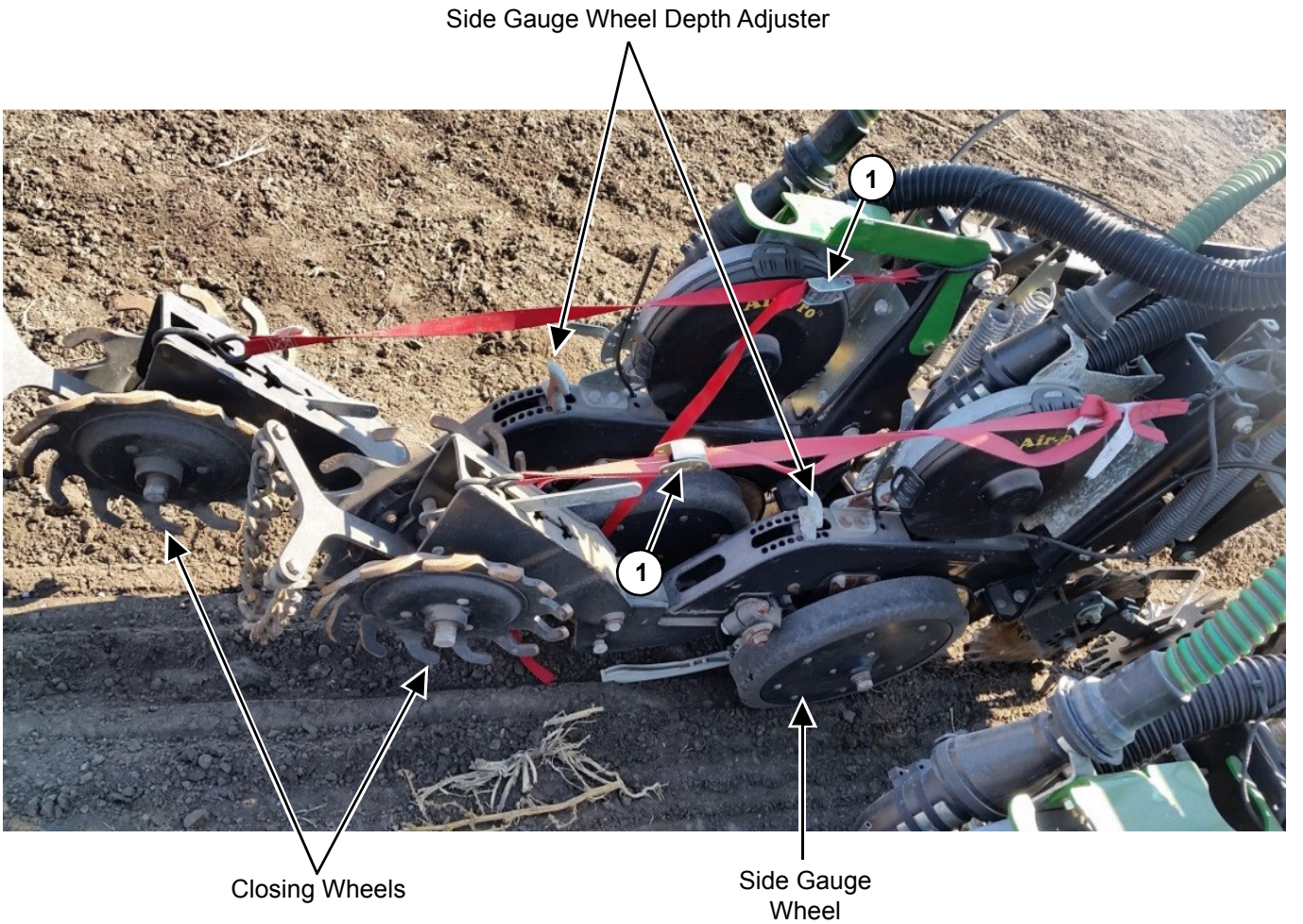
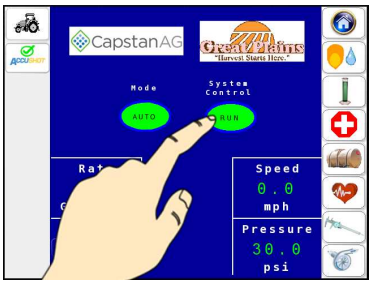


Figure 49

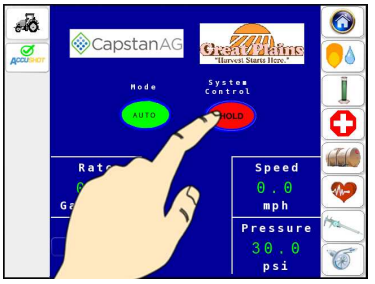


3. **[Figure 50]** - Using the excess from the tie-down strap, or using a bungee strap (1), tie the seed firmer (2) up and out of the furrow.

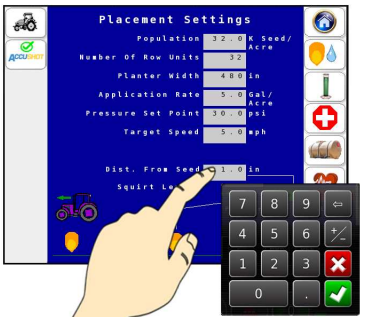
4. Once everything is out of the furrow and off the dirt and secured, return to the tractor cab. On the AccuShot **HOME** Screen, touch and toggle **SYSTEM CONTROL** icon to select **RUN**. Resume planting for the desired test distance, using the same settings and speeds as normal planting.



5. **[Figure 51]** - Stop the tractor once test distance is reached. On the AccuShot **HOME** Screen, touch and toggle **SYSTEM CONTROL** icon to select **HOLD**. Visually verify placement of shot relative to seed in the furrow.



a. If placement needs adjustment, change the ***Distance from Seed*** value on the **PLACEMENT SETTINGS** Screen.



b. Repeat field test to verify correct placement of shot relative to seed.

Figure 50

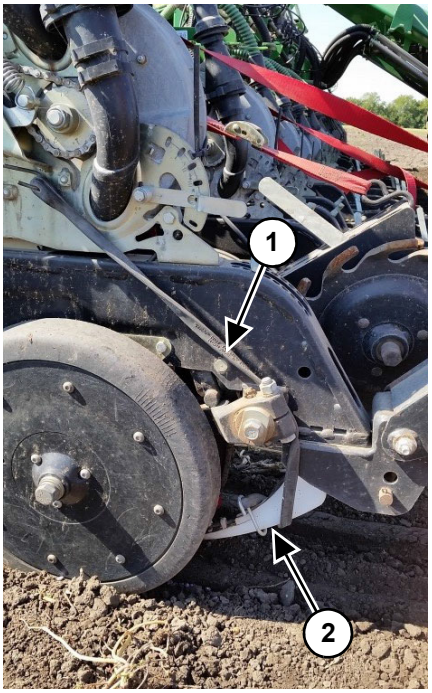
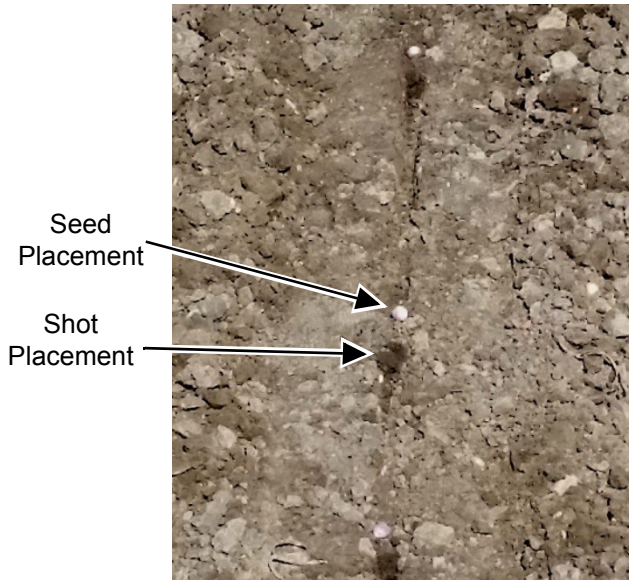


Figure 51

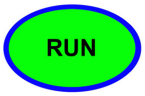


6. When placement of the shot relative to the seed is correct, remove all straps and readjust the Side Gauge Wheel depth back to normal operating depth. (See the manufacturer's specific planter manual for assistance.)

NOTE: Repeat field check periodically or when rate and/or distance to seed is modified.)

4.3 - MANUAL Mode

Manual Mode is used for troubleshooting or continuing to run when a pressure sensor has failed.

Icon	Description
	Touch the red **DIAGNOSTICS** icon to view the **DIAGNOSTIC** screen.
	**[Figure 52]** - Touch to toggle the **TEST PRESSURE** icon to **ENABLE** the Test Pressure. Verify Test Pressure value is correct. **[Figure 53] -** To edit the *Test Pressure* value if not correct, touch the pressure value box to enable the keypad.
	On the **HOME** Screen:
	Touch and toggle **MODE** icon to select **MAN**.
	Touch and toggle **SYSTEN CONTROL** icon to **RUN**.
	Visually monitor the manual pressure gauge on the planter.
	Touch the “% DC” *Arrows* to **INCREASE** or **DECREASE** until the desired pressure is reached on the manual pressure gauge.
	Touch and toggle **SYSTEN CONTROL** icon to select **HOLD**. The liquid product pump will disengage and nozzle valves will not pulse. **HOLD** is recommended when stopping to fill the planter with seed or liquid product.

NOTE: **[Figure 54]** - Upon enabling a **TEST PRESSURE**, “TEST” will blink in the System Pressure box on the **HOME** and **TIP CALIBRATION** Screens.

NOTE: Pressure should be checked and readjusted once the planter is operating.

Figure 52

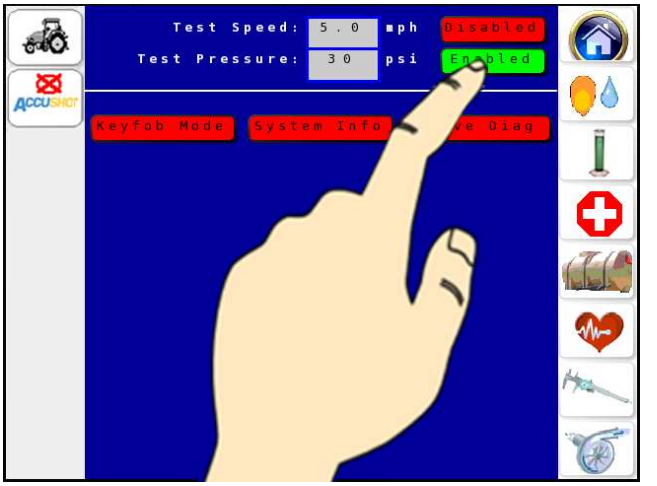


Figure 53

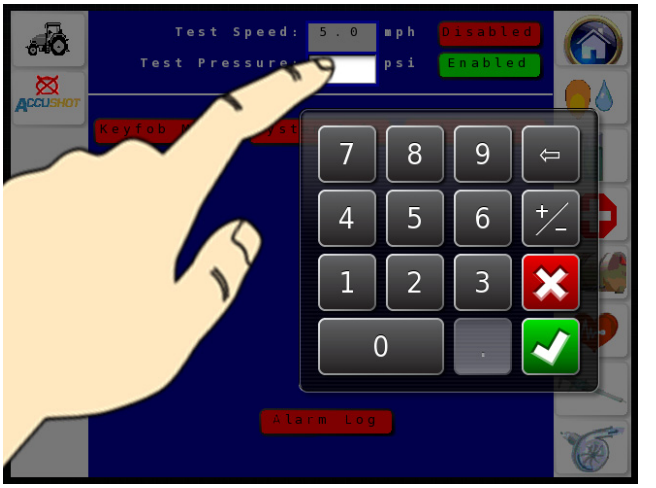
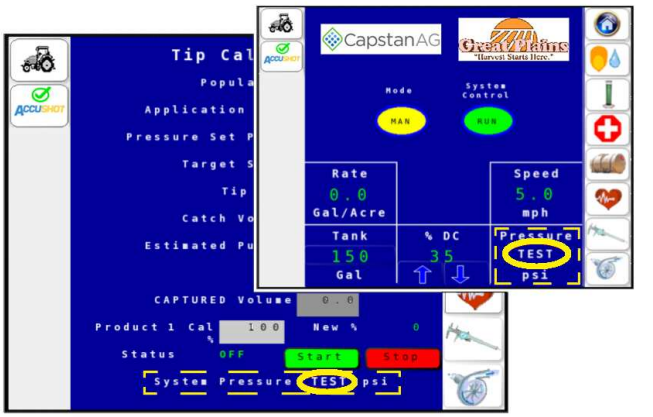


Figure 54



4.4 - OPEN Mode

NOTE: **[Figure 55]** - Install Orifice Plates when running in **OPEN** Mode only. Remove orifice plates if running in Auto or Manual Mode.

Use **OPEN** Mode to apply a constant stream of product. Orifice inserts will be required to achieve the desired GPA. (Use orifice rate charts to size the orifices correctly, or contact your local dealer.) The system pressure automatically adjusts to maintain the requested GPA and each row shuts off independently if a seed is not sensed.

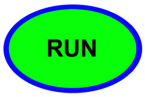
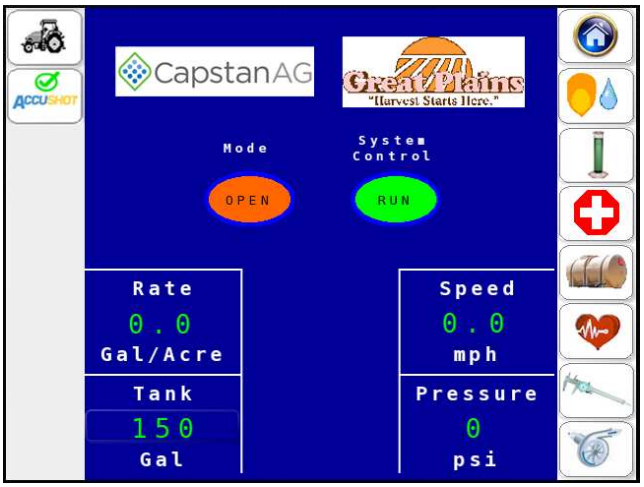
Icon	Description
	**[Figure 56]** - Touch the **HOME** icon:
	Touch and toggle **MODE** icon to select **OPEN**.
	Touch and toggle **SYSTEM CONTROL** icon to select **RUN**.
	Touch and toggle **SYSTEM CONTROL** icon to select **HOLD**. Pump will disengage and nozzle valves will close. **HOLD** is recommended when stopping to fill the planter with seed or liquid product.

Figure 55

Figure 56



4.5 - Active Seed / Valve Sensor Indicators

[Figure 57] - Use the **ACTIVE SEED / VALVE SENSOR INDICATORS** Screen to verify the nozzle valves and seed sensors are working correctly while the planter is operating.

Icon	Description
	Touch the **HEART** icon to verify all rows are working in the **ACTIVE SEED/VALVE SENSOR INDICATOR** Screen. See troubleshooting charts for help with failed rows.

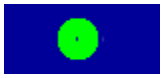
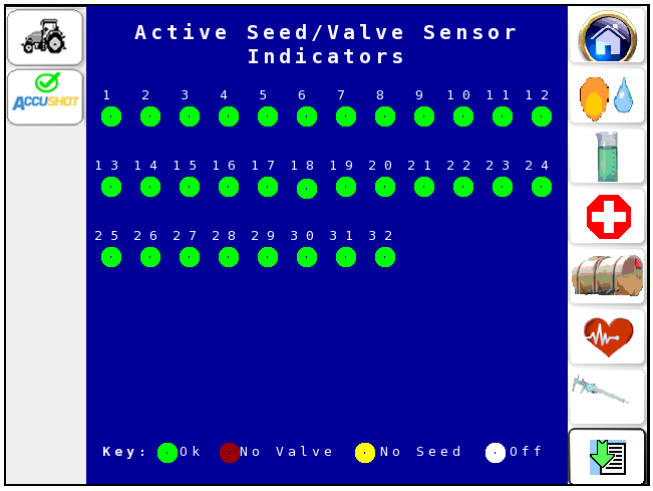
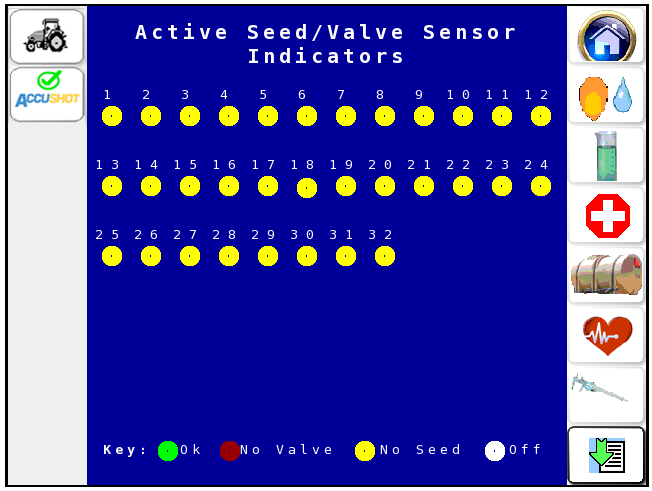
Icon	Key to Indicator Colors
	Indicates seed sensor and nozzle valves are connected and operational.
	Indicates seed sensor is not being detected by the AccuShot controller, while the nozzle valve is operational.
	Indicates nozzle valve is not being detected by the AccuShot controller, while the seed sensor is operational.
	Indicates that rows are disabled or OFF. These rows will not operate.

Figure 57





4.6 - OFF Mode

When the **MODE** is toggled to **OFF**, the system disengages (pump and nozzle valves), and all alarms are deactivated. Choose the **OFF** Mode when the AccuShot system is not being used.

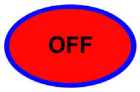
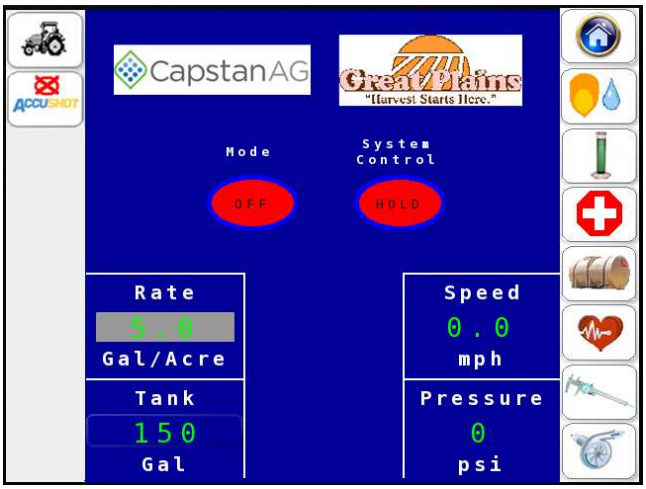
Icon	Description
	**[Figure 58] -** Touch and toggle **MODE** icon to select **OFF**.
	**SYSTEM CONTROL** defaults to **HOLD** when the **MODE** icon is toggled.

Figure 58



4.7 - System Control - Run / Hold

SYSTEM CONTROL allows the operator to toggle between **RUN**/**HOLD** to engage and disengage the liquid product pump.

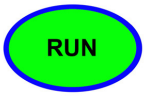
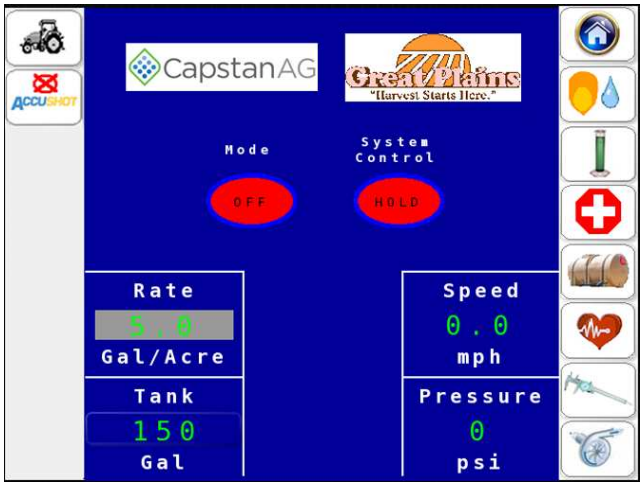
Icon	Description
	On the **HOME** Screen:
	**[Figure 59] -** With the planter hydraulics engaged, and a Mode selected, touch and toggle **SYSTEM CONTROL** icon to select **RUN**. The liquid product pump will engage and raise the pressure to the Pressure Set Point.
	Touch and toggle **SYSTEM CONTROL** icon to select **HOLD**. The liquid product pump will disengage and nozzle valves will not activate. **HOLD** is recommended when stopping to fill the planter with seed or liquid product.

Figure 59



4.8 - ALARM Screens

[Figure 60] - An alarm will sound as an **ALARM** Screen overtakes the display. This occurs when a setting is beyond its set or programmed value anywhere in the system. The alarm will display what setting or programmed value is beyond its limits.

- Touch the **X** icon to leave the screen.

  Touching **X** will only silence the alarm, it will not clear the alarm.

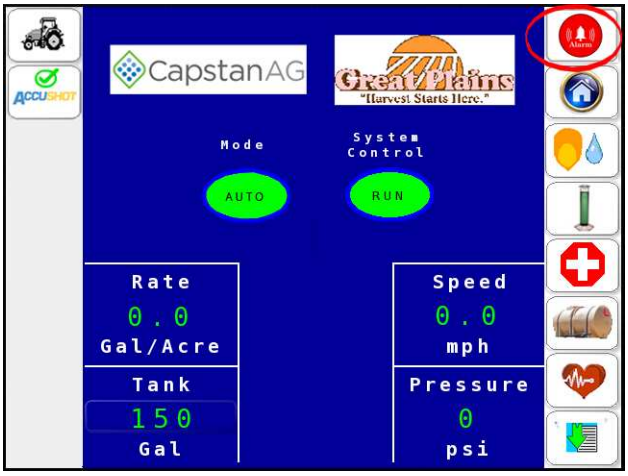
- Touch the **UP** and **DOWN** *Arrow* icons to scroll through alarm screens when more than one alarm is present.

- An **ALARM** icon will appear at the top right side of the **HOME** Screen when there is an alarm in the system.

NOTE: The ALARM fault must be corrected; including the replacement of faulty components to clear the ALARM fault.

A complete list of all ALARMS can be found in the Troubleshooting section

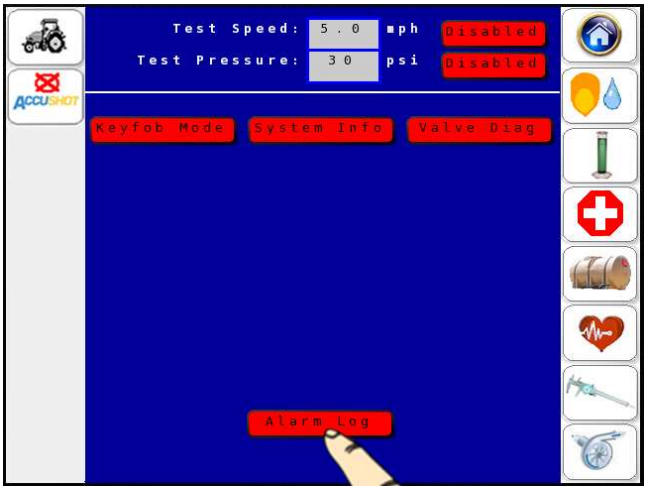
Figure 60



4.9 - Alarm Log

[Figure 61] - Touch the **ALARM LOG** icon on the **DIAGNOSTIC** Screen to view a log of any alarms that have occurred.

Figure 61



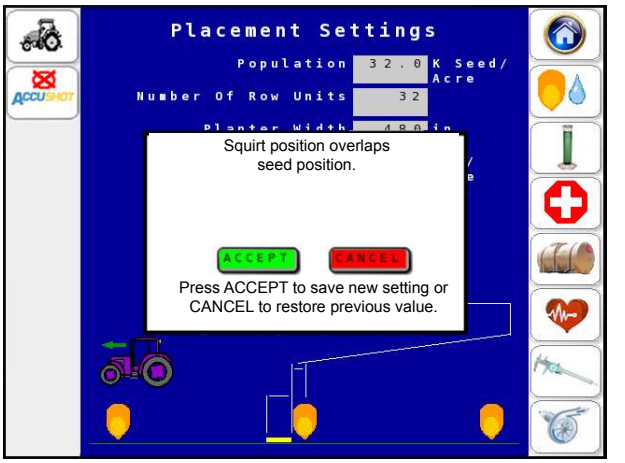
4.10 - WARNING Screens

[Figure 62] - When the operator performs an action that cannot be completed, or could cause a malfunction or misapplication, a pop-up **WARNING** box will appear on the current Screen. ***The warning has to be acknowledged and the fault corrected before the action can be completed or dismissed.***

- There are two different warning boxes.
  1. Operator touches **OK**, then performs the requested action.
  2. Operator has to **ACCEPT** or **CANCEL** the Warning.

A complete list of all WARNINGS can be found in the Troubleshooting section.

Figure 62



THIS PAGE IS INTENTIONALLY LEFT BLANK

5.0 - MAINTENANCE

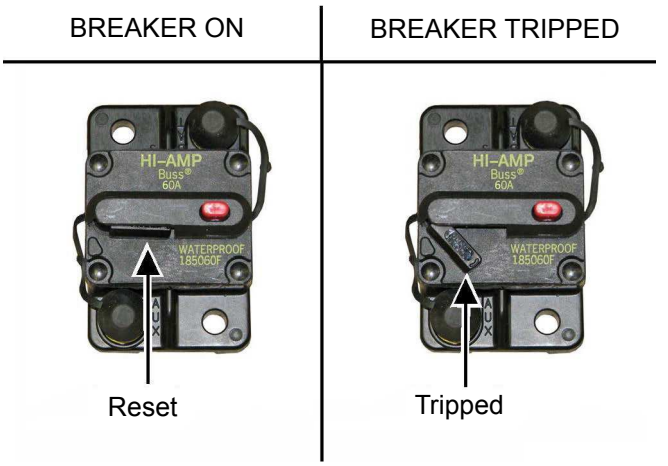
5.1 - Jump Starting/Welding/Charging

- **[Figure 63]** - If jump starting or charging the batteries on the tractor, trip the AccuShot 60A circuit breaker to prevent damage to the AccuShot system.

- If welding on the tractor or planter, trip the AccuShot 60A circuit breaker or the tractor's battery disconnect (if equipped) to prevent damage to the AccuShot system.

NOTE: **[Figure 63]** - The circuit breaker is usually located near the battery or in the battery compartment. The 60A Circuit Breaker is equipped with a manual trip. To reset the breaker, rotate the tripped lever back into the reset position.

Figure 63



Important: When disconnecting the battery terminals, remove the NEG (-) cable first, then remove the POS (+) cable. When connecting cables, connect the POS (+) cable first, then connect the NEG (-) cable.

5.2 - Screens and Strainer

[Figure 64] - AccuShot uses at least one strainer in the plumbing to filter out contamination, and protect the nozzle valves from becoming plugged and causing potential damage.

ALWAYS use an 80 mesh screen.

NOTE: Clean the strainers on a regular basis.

Plugged strainers will cause a reduction in System operating pressure.

It is recommended to use strainers on all nurse tanks and transfer equipment.

Figure 64

Strainer colors may vary by manufacturer.

5.3 - Liquid Product Tube, Check Valve and Spray Tip Access

5.3.1 - Removal

NOTE: When the planter's side gauge wheels and opener discs are removed to gain access to the liquid product tube and spray tip, be mindful to not lose the spacer washers behind the gauge wheels and opener discs as they must be used during reassembly. See the Manufacturer's Planter manual for more service information.

1. Raise the planter and install lift cylinder locks.

2. **[Figure 65]** - Remove the side gauge wheel (1) on the row unit where the check valve and tip requires service. **DO NOT LOSE THE SPACER WASHERS BETWEEN THE WHEEL AND HUB!**

3. **[Figure 66]** - Remove the bolt retaining (4) the opener disc (2) on one side of the row unit.

4. Carefully remove the opener disc. **DO NOT LOSE THE (3) SPACER WASHERS BETWEEN THE OPENER DISC AND HUB!**

5.3.2 - Alignment

When reassembling the check valve and tip after servicing, make sure that the following steps are performed accurately:

5. **[Figure 67]** - The arrow (1) on the check valve is pointing downward to match the direction of fluid flow.

6. The machined flat sides (2) on the outside of the check valve and tip align.

7. The assembled check valve/tip combo (3) is aligned with the flats facing the disc surface after installing the combo on the shot tube.

NOTE: Failure to ensure that the flats are aligned parallel to the disc will result in damage to the check valve and spray tip.

8. Assemble the row unit and measure and adjust (if needed) the disk contact spacing per the manufacturer's planter manual.

HANDLE THE SHARP OPENER DISC WITH GLOVED HANDS TO PREVENT PERSONAL INJURY!

Figure 65

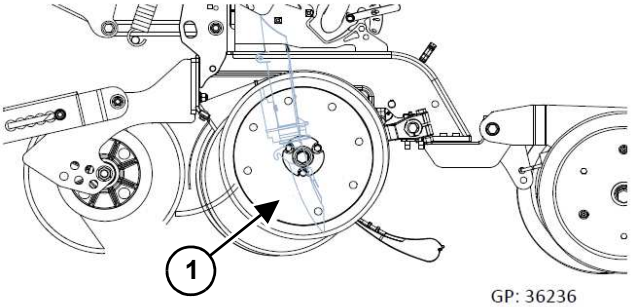


Figure 66

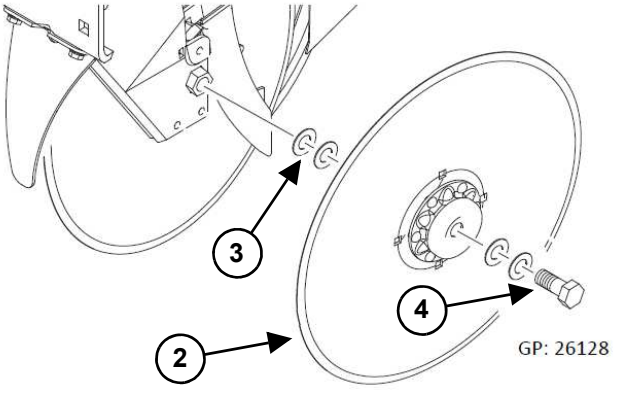
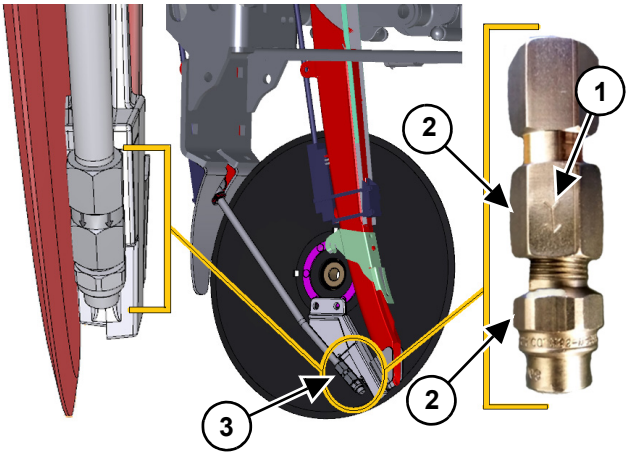


Figure 67



5.4 - Checking and Maintaining GPA in AccuShot

If you change tips, rates, pressure or liquid product, perform the Tip Calibration procedure. See 3.9 - TIP CALIBRATION Catch Test on page 27.

5.5 - Cab Kit

[Figure 68] - Please note that there are several items packaged with the tractor power cable that will assist with maintaining the AccuShot system. These include the following.

ACCUSHOT CAB KIT P/N 115400-001		
PART NO.	**DESCRIPTION**	**QTY**
115290-111	Nozzle Valve Assy, Arag, 12W, HS	2
115300-001	Calibration Container, CapstanAG, 32 oz.	1
115206-100	Key FOB, Planter, 2 Product (with battery)	1
115201-001	Harness, Power, Tractor, 30’, 8 Ga, w/ 60A Circuit Breaker	1
115700-001	Manual, AccuShot Operator and Maintenance	1
115700-002	Manual, AccuShot Quick Start Guide	1

Figure 68

5.6 - Servicing the AccuShot System

- Before servicing the AccuShot system or plumbing components, the boom tubes and liquid delivery lines should be released of all pressure and emptied of product.

5.7 - Inspecting the AccuShot System

- Inspect the AccuShot system hoses for cuts, nicks or abrasions before each use. Replace any damaged hoses immediately.
- Check for loose hoses, mounting hardware and components. Tighten if necessary.
- Make sure all hoses and wiring are secure and routed to avoid all pinch points.
- Check for damaged or missing decals. Replace decals if damaged or missing.

5.8 - Cleaning the AccuShot System

- Flush the AccuShot system with clean water after each use.
- Avoid high pressure spray when cleaning the AccuShot system components, nozzle valves and wiring connectors.

5.9 - Winterizing for Storage

DO NOT USE FERTILIZER TO WINTERIZE! The use of fertilizer for winterization will cause internal damage to the nozzle valves.

- Thoroughly clean the AccuShot system before winter storage.
- Flush the AccuShot system with clean water using the Purge All Valves operation. See Purge Operation on page 22.
- Winterize the AccuShot system with RV antifreeze for winter storage. Proper winterizing of the system is essential. Make sure the lines are completely full of antifreeze at 100% strength and that the nozzle valves are purged until 100% antifreeze is observed at all spray tips.

NOTE: Improper winterizing will result in damage to the internal components of the nozzle valves. Review the manufacturer's planter manuals for more information on proper winterizing.

6.0 - TROUBLESHOOTING

6.1 - Recommended Guidelines

When servicing an AccuShot System, CapstanAG recommends the following three step troubleshooting process:

1. Perform baseline service checks and verify the AccuShot setup values in this manual.
2. Identify individual performance problems. Evaluate possible causes and corrections for performance issues.
3. Troubleshoot individual components and replace if needed.

NOTE: The primary service tool will be a simple multi-meter that can measure voltage (VDC) and resistance (ohms).

6.1.1 - AccuShot Baseline Evaluation Protocol

1. Verify voltage readings. See pages 55.
2. Visually check all wire connections, harnesses, and connectors for loose, broken, or damaged wires.
3. Check Tip selection.
4. Check the AccuShot settings.
5. Make sure the liquid product plumbing and 80 mesh strainer(s) are clean.
6. Perform a “Like Component Swap” to see if the failure follows the component.
7. Repair or replace any damaged components.
8. For Key FOB Tests, see Key FOB controls on page 21.

⚠ WARNING

Before operating or servicing the AccuShot system: Read and understand the manufacturer’s Planter Manual(s) and the AccuShot Operator and Maintenance Manual. Follow the warnings and instructions in the manuals when making repairs, adjustments, or servicing. Check for correct function after adjustments, repairs or service. Untrained operator’s and maintenance personnel’s failure to follow instructions can cause personal injury or equipment damage.

6.2 - Alarms

ALARM #	ALARMS	CAUSE OF ALARMS	CORRECTION
100	VT Board: Communications Error	The VT Board has quit communicating.	Power system down, then power back up.
101	Product 1: Module 1: Communications have stopped.	The #1 IO board has stopped working.	Power system down, then power back up.
102	Product 1: Module 2: Communications have stopped.	The #2 IO board has stopped working.	Power system down, then power back up.
103	Product 1: Module 3: Communications have stopped.	The #3 IO board has stopped working.	Power system down, then power back up.
104	Product 1: Row ? - Coil circuit is open.	The coil wire is pinched, cut, broken or disconnected.	Check the coil connection and lead wires for damage. Repair if necessary.
		Failed coil.	Check coil resistance using a multi-meter. Resistance should be 10-12 ohm. Remove and replace if coil is outside of specified readings.
105	Product 1: Row ? - Coil circuit is shorted.	The coil wire is pinched, cut, broken or experiencing an internal coil short. (This will continue to alarm every 2 minutes until the problem is resolved).	Check coil resistance using a multi-meter. Resistance should be 10-12 ohm. Remove and replace if coil is outside of specified readings.
106	Product 1: Row ? - Nozzle valve plunger is lodged open.	Debris in nozzle valve.	Clean Debris from affected nozzle valve. See page 54.
107	Product 1: Row ? - Nozzle valve plunger is lodged closed.	Debris in nozzle valve.	Clean Debris from affected nozzle valve. See page 54.
108	Product 1: Row ? - The nozzle valve is missing a plunger.	No Plunger in nozzle valve.	Install Plunger.
109	Product 1: Row ? - Seed Sensor Error. Check seed sensor connection.	Seed Sensor not being sensed.	Check connection to Seed Sensor tee.
		Failed Seed Sensor.	Replace Seed Sensor.
110	Product 1: Check Pressure sensor - pressure sensor not at zero. Cycle key power to clear the alarm.	Pressure sensor is damaged or unplugged. VT harness to pressure sensor is damaged.	Replace pressure sensor. Plug in pressure sensor cable. Inspect VT harness from Controller to pressure sensor, replace if damaged. **(After performing above steps, Power the system down, then power the system back up.)**

ALARM #	ALARMS	CAUSE OF ALARMS	CORRECTION
111	Product 1: Tank: Warning Level Reached.	Liquid product in tank is below warning level.	Fill tank with liquid product, reset tank volume.
112	Low system pressure - Check tank level, tank shutoff valves or pressure sensor.	System pressure either hasn't reached 10 PSI, or has dropped below 10 PSI. Once this alarm sounds, pump will shut down in 10 seconds.	Check tank level, tank shutoff valves or pressure sensor.
113	Product 1: Low Pressure, System Shutoff.	System pressure has been under 10 PSI for too long, pump has shut down.	Check tank level, tank shutoff valves or pressure sensor.
114	Product 1: System is in “HOLD” mode, and seeds are being sensed. 1. Change the System Control button to “RUN”. Or 2. Change the Mode button to “OFF” to disable the system.	The System Control button is still in HOLD and planter is dropping seeds.	Toggle System Control button to RUN. Or Toggle Mode button to OFF to shut system off.
115	Product 1: System is not functioning due to lack of ground speed. Check that the GPS receiver is plugged in and working correctly.	No Speed Input (Minimum 500 seeds before alarm displays).	Check to make sure that you have GPS signal from the System Info screen in the Diagnostics Page. Check VT Harness from Controller to GPS Receiver. See page 57 for information on bypassing GPS receiver.
116	Product 1: Pump has reached maximum duty cycle. Check for: 1. Hydraulic Flow. 2. Plugged Strainer. 3. Pump connections.	Hydraulics are not turned on.	Turn hydraulics on.
		Hydraulic flow is set to low.	Increase hydraulic flow rate.
		Strainer is plugged.	Clean Debris from Strainer.
		Electrical connections to pump are unhooked.	Make sure electrical connections to pump are connected.
		Maximum duty cycle setting is set to low.	Increase Maximum duty cycle setting.
117	Product 1: Shorted Circuit has been detected on pressure sensor 1. Check pressure sensor, connections, and wiring.	A short on the pressure sensor circuit has been detected.	Check the pressure sensor and make sure no wires are broken, pinched or bare.
			Check the wiring harness from the Controller to the pressure sensor for bare, pinched, or broken wires.

ALARM #	ALARMS	CAUSE OF ALARMS	CORRECTION
118	Product 1: Shorted Circuit has been detected on flow meter 1. Check pressure flow meter, connections, and wiring.	A short on the flow meter circuit has been detected.	Check the flow meter and make sure no wires are broken, pinched or bare. Check the wiring harness from the Controller to the flow meter for bare, pinched, or broken wires.
119	Product 1: Shorted Circuit has been detected on product pump. Check pressure product pump, connections, and wiring.	A short on the product pump circuit has been detected.	Check the product pump and make sure no wires are broken, pinched or bare. Check the wiring harness from the Controller to the product pump for bare, pinched, or broken wires.
120	Product 1: Shorted Circuit has been detected on GPS. Check pressure GPS, connections, and wiring.	A short on the GPS circuit has been detected.	Check the GPS and make sure no wires are broken, pinched or bare. Check the wiring harness from the Controller to the GPS for bare, pinched, or broken wires.
121	Product 1: Squirt position exceeds operational range. Seeds are being sensed but valves CANNOT open. Planter travel speed is too slow for valves to open.	Actual planting speed is too slow for valves to physically open.	Set the Distance from the seed closer to the seed or increase your Travel Speed.

6.3 - Attention Screens

ATTN #	ATTENTION SCREENS	CAUSE OF ATTENTION	CORRECTION
200	Continuous GPS ground speed has been detected while using a test speed. Select “GPS Speed” or “Test Speed” from the soft key list.	The Test Speed is Enabled, and the system senses a continuous GPS speed.	Select one of the Yellow soft key boxes on the right side of the monitor to either continue running with the test speed or to switch to GPS speed.
201	Seeds are being detected on disabled row(s). Select “Ignore” or “Enable All Rows” from the soft key list.	Rows are disabled, but seeds are still being sensed on those rows.	Select one of the Yellow soft key boxes on the right side of the monitor to either continue planting with disabled rows, or to enable all rows.

6.4 - Warnings

WARNING #	WARNING SCREENS	CAUSE OF WARNINGS	CORRECTION	PAGE #
300	You must first place the System Control in HOLD and Mode in OFF before you can activate the valve diagnostic screen.	Trying to run diagnostics with the Mode in another state other than OFF.	Toggle the Mode to OFF.	20
301	You must first place the System Control in HOLD and Mode in OFF before you can activate Key FOB Mode.	Trying to access Key FOB Screen with the Mode in another state other than OFF.	Toggle the Mode to OFF.	21
302	You must first place the System Control in HOLD and Mode in OFF before you can enter the tip calibration screen.	Trying to access Tip Calibration screen with the Mode in another state other than OFF.	Toggle the Mode to OFF.	27
303	Nozzle valves may not fully open because shot length is too short. Check the population, application rate or pressure set point.	Placement Settings are outside that of which the nozzle valves will open completely.	Decrease population, increase application rate or decrease pressure set point.	15
304	Squirt position overlaps seed position.	Selected to place the product on the seed.	Select Accept or Cancel for chosen action.	38

WARNING #	WARNING SCREENS	CAUSE OF WARNINGS	CORRECTION	PAGE #
306	The pump has been turned off due to low system pressure. Check tank level, tank shutoff valves or pressure sensor.	System pressure hasn't reached 10 PSI, or has dropped below 10 PSI for too long.	Check tank level, tank shutoff valves or pressure sensor.	28
307	Squirt position exceeds operational range. Nozzle valves may never open.	Squirt distance from the seed has been set so far in front of the seed that the system cannot physically act fast enough to open the nozzle valves and seed sensors.	Set the Distance from the shot closer to the seed.	32
308	Number of rows entered doesn't match the number of rows detected. Make sure the correct number of rows was entered, or check valves/seed sensors.	The system has sensed that the number of rows that has been entered in the Placement Settings screen is not the number of rows that the system is sensing.	Verify that the correct number of rows has been entered in the “Number of Rows” box in the Placement Settings screen. Verify that all nozzle valves and seed sensors are working correctly.	15
310	Are you sure you want to stop displaying on this monitor and switch to the next monitor?	Operator has pressed the “switch monitor” icon.	Select Accept or Cancel for chosen action.	12

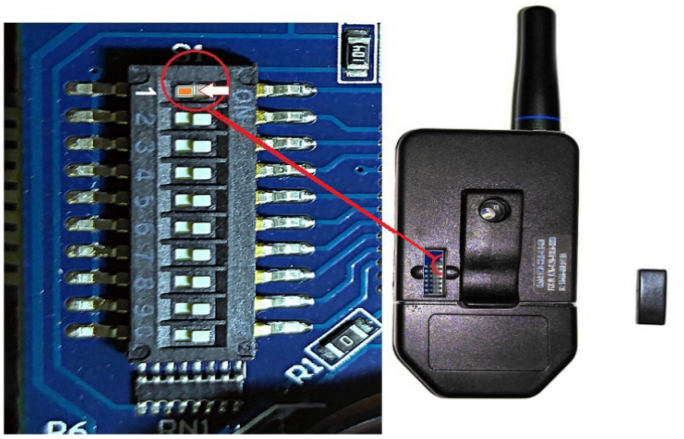
6.5 - Troubleshooting Chart

PROBLEM	CAUSE	CORRECTION
AccuShot will not load on VT Display.	Power harness unplugged at hitch.	Plug in power harness.
	Power harness unplugged at controller.	Plug in power harness.
	60A breaker tripped at battery.	Reset breaker.
	VT Display harness unplugged at controller.	Plug in VT Display harness.
	5A blade fuse blown on VT Display harness.	Replace 5A blade fuse.
	CAN connector unplugged on planter.	Plug in CAN connector.
	Two VT monitors are on same CAN.	Make sure UT setup has different numbers for both monitors.

PROBLEM	CAUSE	CORRECTION
System pressure cannot reach desired pressure.	Maximum Pump Duty Cycle is set too low (Pump Screen).	Run system in Manual Mode and toggle the % DC up until the pump quits building pressure. This pressure reading should be the Maximum Duty Cycle setting.
	Low hydraulic flow.	Increase hydraulic flow.
	Bypass valve is open too far.	Close down bypass valve until reaches desired pressure.
	Plugged liquid strainer.	Check / Clean liquid strainer.
System pressure is oscillating while operating.	Bypass valve is open too far.	Close bypass valve slightly until problem is resolved.
	Bypass valve is closed too much.	Increase bypass until problem is resolved.
		Open valves on back of tank(s).
	Plugged liquid product strainer.	Check / Clean liquid strainer.
	Pump settings need adjustment.	System Gain needs a lower number.
Pump is taking too long to build pressure.	Pump settings need adjustment.	System Gain needs a higher number. Contact Dealer to unlock Pump Settings Screen.
Single row will not shut off.	Check valve is lodged open.	Clean or replace check valve.
	Nozzle valve is lodged with debris.	Clean the nozzle valve.
	O-Ring at nozzle valve is pinched or broken.	Replace the O-Ring.
Single row drips when planter is raised.	Check valve is lodged open.	Clean or replace check valve.
Excessive air is in the lines when operating the key FOB.	Check valve is lodged open or worn out.	Clean or replace check valve.
	Tubing from nozzle valve to row unit is not seated properly in push-to-connect.	Push tubing into push-to-connect. (There is a lock that can be installed to hold these from backing out).

PROBLEM	CAUSE	CORRECTION
Under application.	Plugged filter.	Clean or replace filter.
	Filter is not installed correctly.	Check filter for correct installation.
	Plugged, kinked or collapsed hoses / tubes.	Check all hoses / tubing and replace as needed.
	Incorrect Rate settings.	Check and adjust rate settings.
	Standpipes are full of liquid.	Remove standpipes and drain liquid out.
	Incorrect Product Cal #.	Re-run tip calibration.
Over application.	Incorrect Rate settings.	Check and adjust rate settings.
	Incorrect Flow Cal #.	Re-run Tip Calibration.
	Worn Tips.	Re-run Tip Calibration.
Key FOB not working.	Faulty battery.	Replace battery.
	Make sure that Antenna on Controller is not broken.	Replace antenna.
	Dip switch #1 in Key FOB is not set to “OFF”.	**[Figure 69]** - Set #1 switch to “OFF”.
Rate on AccuShot screen is low but has been running correctly.	Plugged tips, check valves or row tubes.	Run Key FOB and unplug.
Pressure is dropping when planter is lowered into the ground.	Low hydraulic pressure.	Raise engine RPM, try to keep engine RPM up when putting planter back in ground.

Figure 69



6.6 - Nozzle Valves

NOTE: Plugged nozzle valves will cause an alarm on the display. Before removal or installation of the nozzle valves, make sure that the pressure has been released from the boom tubes.

Plugged nozzle valves can be classified into two categories:

- Plunger blockage.
- Plunger stuck.

[Figure 70] - **Plunger blockage** results when larger debris catches between the orifice (1) and plunger seal (2). This is the smallest flow passage within the nozzle valve.

Stuck plungers result when smaller debris collects around the plunger barrel (3) and binds the plunger in place.

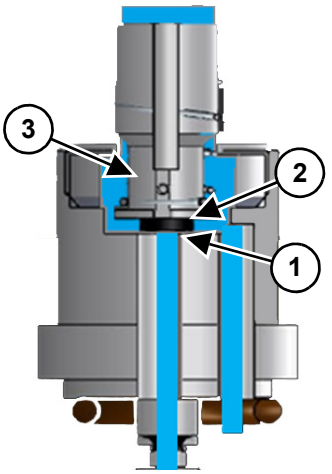
Symptoms of a blocked or stuck plunger are:

- No spray.
- Constant spray.
- Dripping when the nozzle is shut off.

NOTE: Pinched or split O-rings will also cause nozzles to drip when shutoff.

NOTE: Operating a plugged nozzle valve for extended periods of time may result in a nozzle valve coil failure. Clean any plugged nozzle valves immediately.

Figure 70



6.6.1 - Nozzle Valve and Body Cleaning

WARNING

CHEMICAL RESIDUES MAY BE PRESENT IN THE AGRICULTURAL EQUIPMENT. RELEASE PRESSURE ON THE BOOMS BEFORE SERVICING. RINSE THE SYSTEM WITH CLEAN WATER PRIOR TO INSTALLING OR SERVICING FITTINGS, HOSES, VALVES, OR NOZZLE VALVES. USE PROPER PPE AT ALL TIMES TO AVOID PERSONAL INJURY.

1. **[Figure 71]** - Rotate the flynut **(4)** CCW to remove the nozzle valve assembly (1-7) from the nozzle valve body (8).

2. Clamp pliers on the valve body (5) and hold the assembly with the coil pigtail facing the ground. Rotate the coil (1) CCW to gain access to the plunger (2). Clean all components.

NOTE: WASH debris from the nozzle valve components (items 2 thru 7) *with clean water*. **DO NOT** use brake cleaner or seal damage will occur.

6.6.2 - Plunger Seal Inspection

3. **[Figure 72]** - After extended use, the soft plunger seal (1) may wear a groove where the seal impacts the hard orifice seat. Replace the plunger if it is worn or damaged.

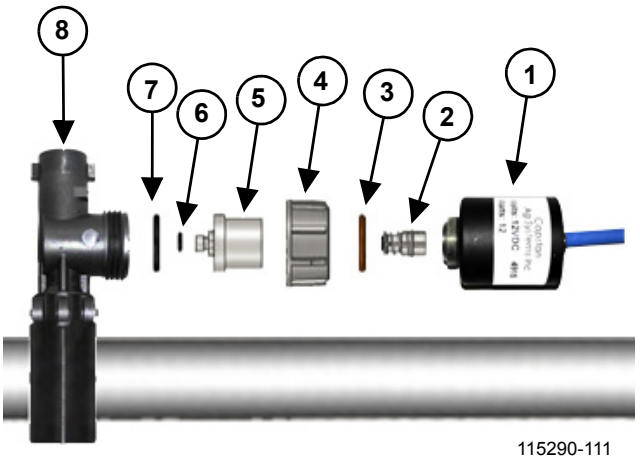
NOTE: As the groove deepens, the pressure capacity of the nozzle valve will decrease until the pressure capacity interferes with the operating pressure of the Seed-Squirter. The result is erratic pulsing, often described as “flickering”.

4. **[Figure 71]** - Place the plunger (2) into the coil assembly cavity (1). Hold the valve body (5) with pliers and rotate the coil assembly CW to tighten until it contacts the hard stop, (about 40-inch lbs.).

5. **[Figure 71]** - Hand-tighten the flynut (4) onto the nozzle valve body (8). The nozzle valve assembly should not rotate. If the coil (1) spins, re-tighten the nozzle valve flynut until the coil housing does not rotate.

NOTE: AccuShot will operate normally at lower pressures with a worn out plunger until replacement parts can be acquired. Operating at or above 60 PSI and abrasive liquid products will accelerate the wear of the plunger seal material.

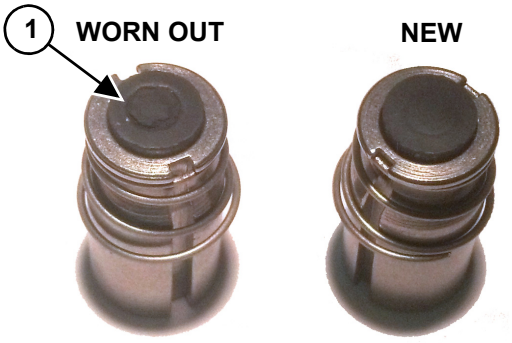
Figure 71



NOTE: Only 12 watt solenoids have a blue sleeve over the pigtail.

ITEM	DESCRIPTION	PART NO. ARAG
1	Coil Assembly, 12 watts	625147-011
2	Plunger	716009-113
3	O-ring	715022-204, Size-015
4	Flynut	717101-006
5	Valve Body	116182-111
6	O-ring, Stem	715022-201, Size-008
7	O-ring	715022-205, Size-015
8	Nozzle Valve Body	

Figure 72: Plunger Seal Inspection



6.6.3 - Coil Failure Test

Coil failures are often the result of:

- Extended nozzle valve use with a plugged nozzle.
- Extended use in liquid fertilizer overspray environments.

NOTE: CapstanAG recommends cleaning any plugged nozzle valves immediately. CapstanAG also recommends rinsing the inside of the AccuShot system with clean water and washing the outside of the coils with clean water as often as practical.

[Figure 73] - Use a voltmeter to measure resistance across pins A and B on the nozzle valve connector. A normal reading is 10 to 12 ohms.

If proper resistance is not found:

- Clean the connector terminals.
- Replace the coil.

Figure 73

6.7 - Pressure Sensor

WIRE LOCATION	WIRE DESCRIPTION	WIRE COLOR
Pin A	Signal	White
Pin B	Power 12V	Red
Pin C	Ground	Black

[Figure 74] - AccuShot uses a 100 PSI / 0.5-5V Pressure sensor. To view the sensor voltage, open the System Info screen under the Diagnostics page. When the pump is shut off, and the system pressure is at 0 PSI, the sensor voltage should read 0.5 volts (+/- 0.15 volts). When the pump is engaged and pressure starts to build, the pressure sensor voltage will increase as well. At 30 PSI, the pressure sensor voltage will be approximately 1.80 VDC.

*Voltages outside of these ranges indicate:

1. A damaged pressure sensor that needs to be replaced.
2. An unplugged pressure sensor.
3. A damaged wire harness.

Upon replacement or repair of the pressure sensor, the tractor's key switch power must be cycled off then back on.

NOTE: Pressure sensors should always be mounted vertically to prevent liquid product from potentially plugging sensor assembly.

Figure 74

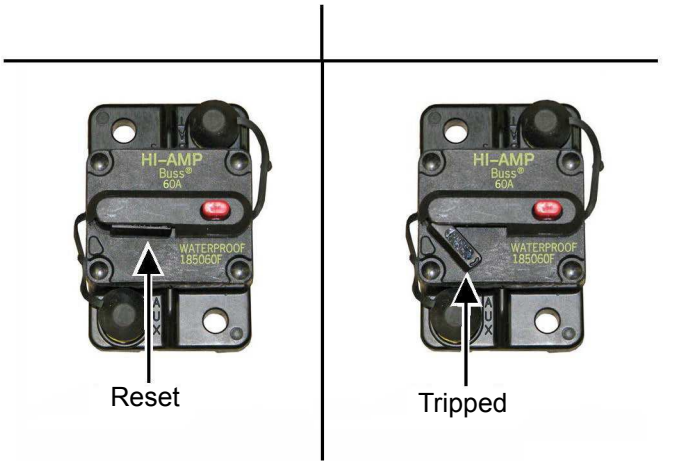
6.8 - Circuit Breaker

[Figure 75] - A circuit breaker is located near the battery or in the battery box.

CIRCUIT BREAKER LOCATION	RATING	TYPE
Battery	60A	Auto or Manual Trip, Manual Reset

A tripped circuit breaker is an indicator of a short or overload condition.

Figure 75

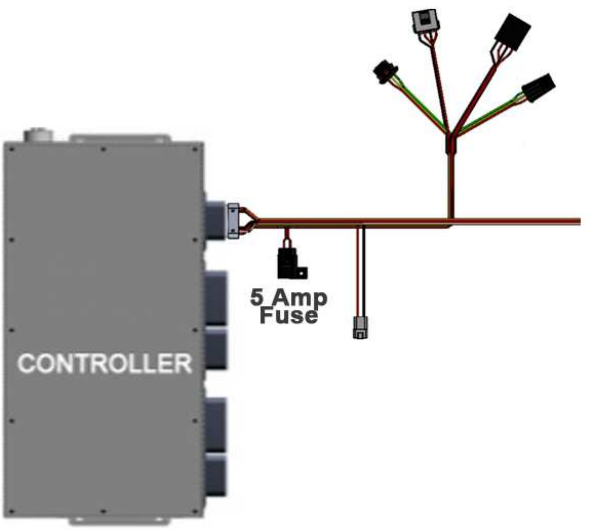


6.9 - Fuse / Key Switched PWR

FUSE LOCATION	RATING	TYPE	COLOR
Sensor / VT Harness	5A	ATO/ ATC (inline)	Tan or Orange

[Figure 76] - Blown fuses are indicators of a short or overload condition. Never replace a fuse with a larger fuse. Larger fuses may result in costly component failures. This fuse is located in the Accessory harness for the AccuShot controller.

Figure 76



6.10 - Check Valve / Spray Tip Alignment

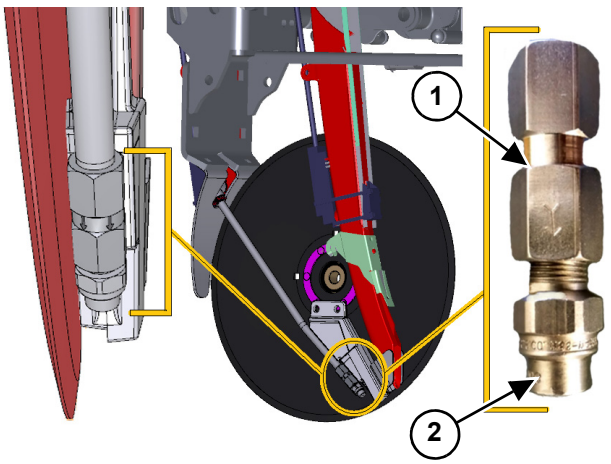
[Figure 77] - A 7 PSI check valve (1) is used ahead of the tip (2).

All flat surfaced check valves and tips are installed so the flats are parallel to the opener discs to prevent rubbing against the discs. The arrow on the check valve will point toward the ground when properly installed.

Several tip sizes are available. See your planter manufacturer for assistance in selecting the correct tip for your application.

See Chapter 5.0, Section 5.3 for more information.

Figure 77



6.11 - GPS Receiver / Test Speed

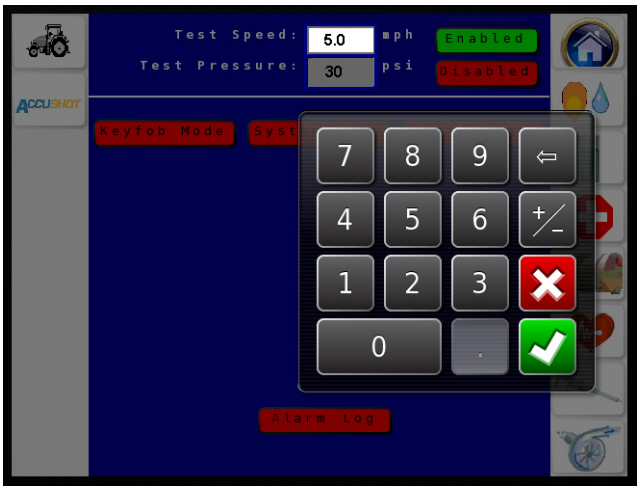
[Figure 78] - AccuShot requires a GPS receiver, separate from the tractor's GPS receiver, connected for ground speed, location and time stamp. It is essential for this GPS to work correctly. Periodically inspect the GPS harness for pinches and cut wires. Clean the area surrounding the magnet of any material that may have been attracted to the magnetic mounting base.

Figure 78

[Figure 79] - In the event there is an AccuShot GPS failure (not tractor GPS), Press the diagnostics button on the **HOME** Screen. Manually set the test speed in the **DIAGNOSTIC** Screen to match tractor ground speed. Continue planting operation until GPS is restored.

NOTE: When GPS is working again, an ATTENTION Screen will overtake the monitor and ask the operator if they would like to continue with the test speed or use GPS Speed.

Figure 79



THIS PAGE IS INTENTIONALLY LEFT BLANK

Yield-Pro® Planter Warranty

Great Plains (a division of Great Plains Manufacturing, Inc.) warrants to the original purchaser that this Great Plains unit will be free from defects in material and workmanship for a period of one year from the first use date when used as intended and under normal service and conditions for personal use; ninety days for custom/commercial or rental use.

A Second year limited warranty covers units utilizing Yield-Pro (YP) planter frames with 25 series row units and singulating type meters. The second year limited warranty covers parts only (personal usage only excluding labor and wear items) on the following: hitch main frame, gauge wheels, and markers, air box/manifold, Y-splitter tubes, and fan and housing, row unit weldments, unit mounted attachments, and frame mounted attachments.

This Warranty is limited to the replacement of any defective part by Great Plains and the installation by the dealer of any such replacement part. Great Plains reserves the right to inspect any equipment or part which are claimed to have been defective in material or workmanship.

The following items and/or conditions are **not covered under warranty**: failures resulting from abuse or misuse of the equipment, failures occurring as a result of accidental damage or acts of God, failures resulting from alterations or modifications, failures caused by lack of normal maintenance as outlined in the operator's manual, repairs made by non-authorized personnel, items replaced or repaired due to normal wear (such as wear items and ground engaging components), repeat repair due to improper diagnosis or repair by the dealer, temporary repairs, service calls and/or mileage to and from customer location, overtime premium, or unit hauling expenses. The warranty may be voided if the unit is towed at speeds in excess of 20 miles per hour (32 kilometers per hour), or is used in soils with rocks, stumps, or other obstructions.

Great Plains reserves the right to make changes in materials or design of the product at any time without notice. The warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct or consequential or contingent to property. Furthermore, Great Plains shall not be liable for damages resulting from any cause beyond its control. This warranty does not extend to crop loss, losses caused by planting or harvest delays or any expense or loss of labor, supplies, rental machinery, or for any other reason.

No other warranty of any kind whatsoever express or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This warranty is not valid unless the unit is registered with Great Plains within 10 days from the date of the original purchase.

THIS PAGE IS INTENTIONALLY LEFT BLANK

SETUP RECORD - FOR DEALER AND CUSTOMER USE

DESCRIPTION	STANDARD		METRIC	
3.5 PLACEMENT Settings	**DEFAULT**	**ACTUAL**	**DEFAULT**	**ACTUAL**
Population (No. of seeds)	32.0 K seed/acre		79.1 K seed/hect-are	
Number of Row Units	32		32	
Planter Width	480 inch		1219 cm	
Application Rate	5.0 GPA		32.7 l/ha (liter/ hectare)	
Pressure Set Point	30.0 PSI		206.8 kPa	
Target Speed	5.0 MPH		8.0 km/h	
Dist. From Seed	1.0 inch		2.5 cm	
3.9 TIP CALIBRATION Settings				
Tip Size	8		8	
Product 1 Cal (%)	100		100	
3.10 TANK VOLUME Settings				
Tank Volume	200 gallon		757 liter	
Warning Level	20 gallon		76 liter	
3.11 SENSOR Settings				
Low Pressure Voltage	0.5 VDC		0.5 VDC	
High Pressure Voltage	5.0 VDC		5.0 VDC	
Low Pressure Value	0.0 PSI		0 kPa	
High Pressure Value	100 PSI		689 kPa	
Speed Cal	60.0 pulses/400 ft		196.9 pulses/100 m (meter)	
Row Fail Rate	1 seed/sec.		1 seed/sec.	
Flowmeter Cal	1740 pulses/10 gallons		460 pulses/10 l (liters)	
3.12 PUMP Settings				
P	5 0		5 0	
I	100		100	
D	50		50	
System Gain	4		4	
Flow Meter Filter	5.0 sec.		5.0 sec.	
Pressure Sensor Filter	3.7 sec.		3.7 sec.	
Minimum Duty Cycle	34		34	
Maximum Duty Cycle	60		60	

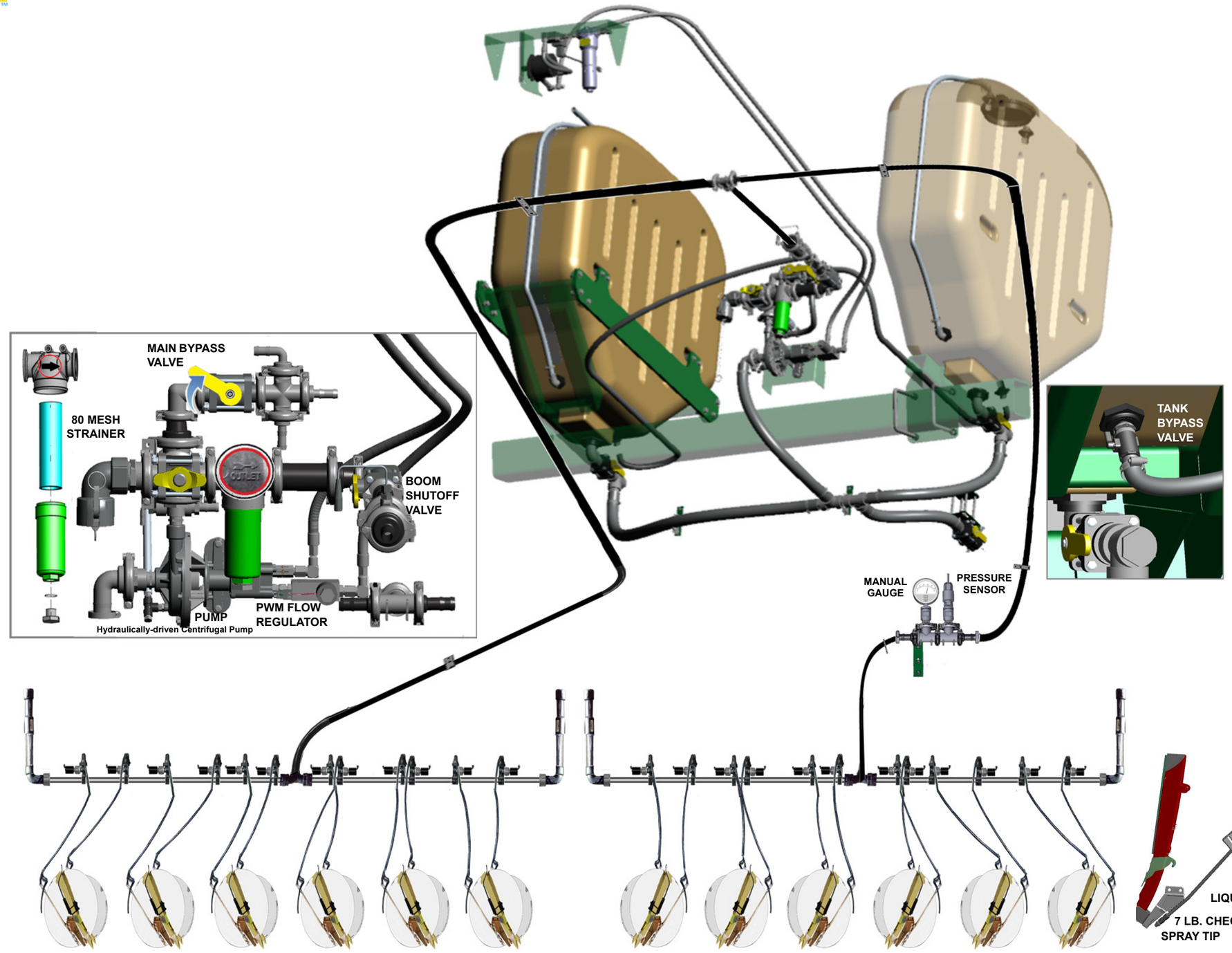
NOTES

8.0 - PLANTER PLUMBING AND ELECTRICAL SCHEMATICS

ACCUSHOT™

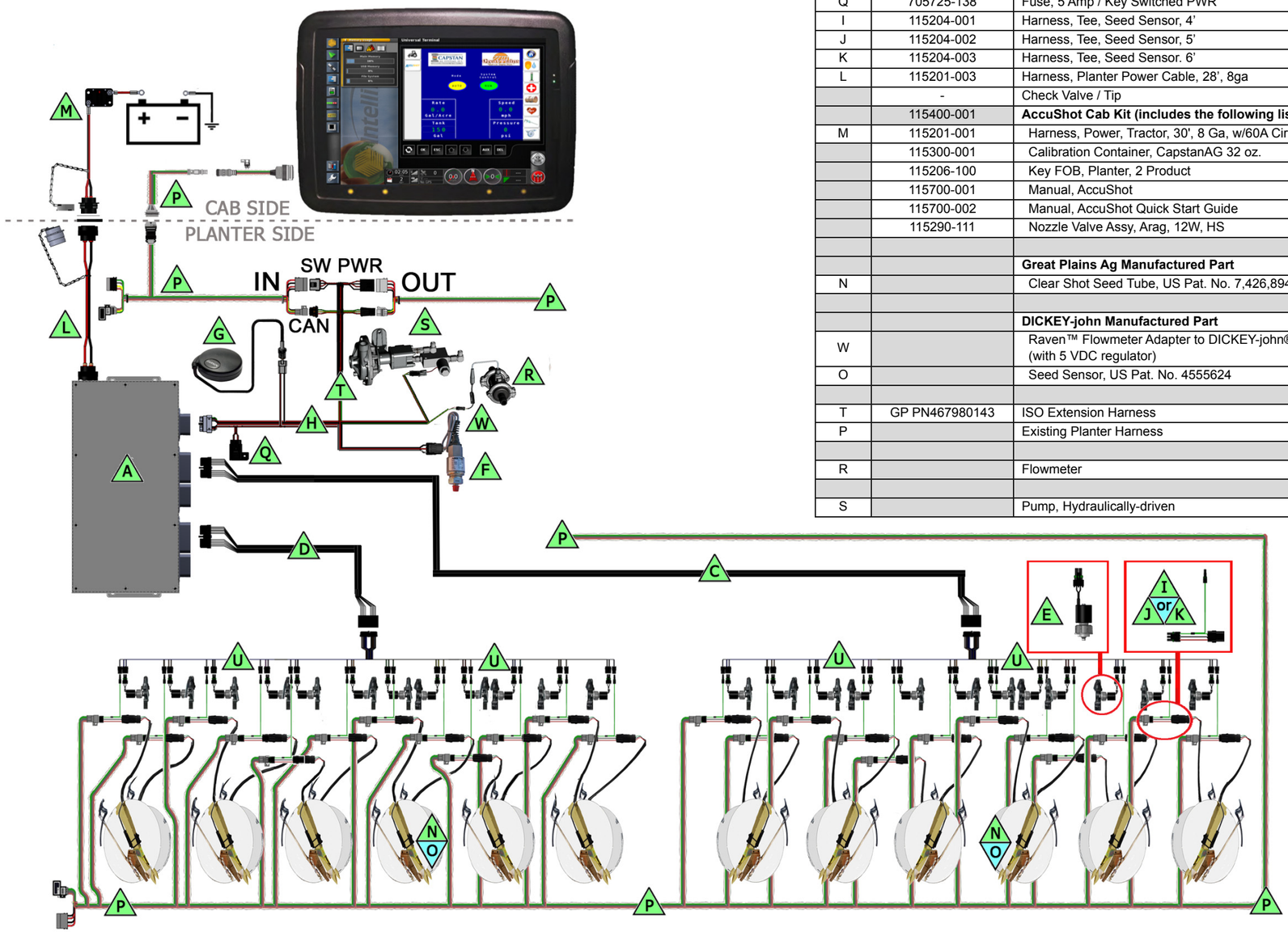
Great Plains
"Harvest Starts Here."

8.1 - Plumbing System Diagram



8.2 - Parts and Component Locator

NOTICE VARIOUS VT Display BRANDS MAY NOT DISPLAY THE MENU SCREEN AS SHOWN.



NOTE: This parts list is an example parts list for a 12 row twin planter. The quantities, descriptions and part numbers may vary for other planter configurations.

ITEM	CAPSTANAG PN	CAPSTANAG DESCRIPTION	QTY
A	115100-361	AccuShot 3600 Controller	1
U	115200-003	Harness, Planter, GP, 12R15	2
C	115203-004	Extension, Planter, 12 Row, 27’	1
D	115203-005	Extension, Planter, 12, Row, 4’	1
E	115290-111	Nozzle Valve Assy, Arag, 12W, HS	24
F		Manual Pressure Gauge	1
G	115206-001	GPS Sensor, 1Hz NEMA, Magnetic Mount	1
H	115205-001	Harness, Planter, GP, Sensor, ACC	1
Q	705725-138	Fuse, 5 Amp / Key Switched PWR	1
I	115204-001	Harness, Tee, Seed Sensor, 4’	TBD
J	115204-002	Harness, Tee, Seed Sensor, 5’	TBD
K	115204-003	Harness, Tee, Seed Sensor. 6’	TBD
L	115201-003	Harness, Planter Power Cable, 28’, 8ga	1
	-	Check Valve / Tip	TBD
	115400-001	**AccuShot Cab Kit (includes the following list below)**	1
M	115201-001	Harness, Power, Tractor, 30', 8 Ga, w/60A Circuit Breaker	1
	115300-001	Calibration Container, CapstanAG 32 oz.	1
	115206-100	Key FOB, Planter, 2 Product	1
	115700-001	Manual, AccuShot	1
	115700-002	Manual, AccuShot Quick Start Guide	1
	115290-111	Nozzle Valve Assy, Arag, 12W, HS	2
		Great Plains Ag Manufactured Part	
N		Clear Shot Seed Tube, US Pat. No. 7,426,894	
		DICKEY-john Manufactured Part	
W		Raven™ Flowmeter Adapter to DICKEY-john® Controller Adapter Cable (with 5 VDC regulator)	
O		Seed Sensor, US Pat. No. 4555624	
T	GP PN467980143	ISO Extension Harness	
P		Existing Planter Harness	
R		Flowmeter	
S		Pump, Hydraulically-driven	

NOTE: If the system has a larger controller, add an extension harness and a planter harness for every board in the controller.

5400 Controller

THIS PAGE IS INTENTIONALLY LEFT BLANK

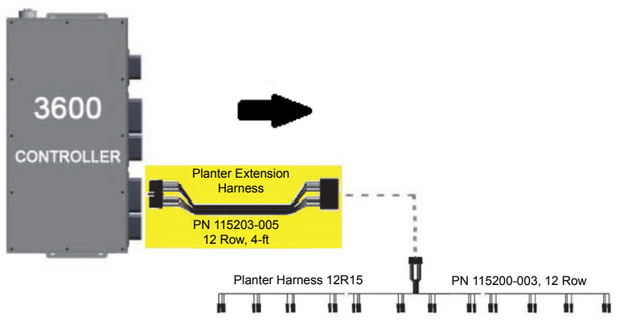
9.0 - HARNESSES

9.1 - Extension Harness, 12R15, 4-FT

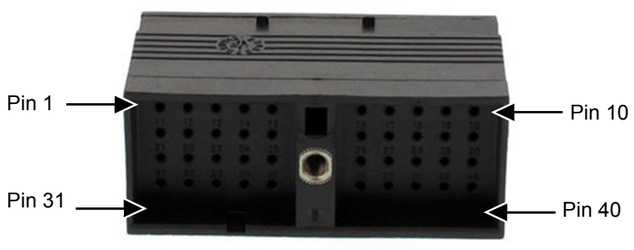
NOTE: The pages in this section show example harnesses. The pinouts are the same per designated harness, but length and part number could be different.

Connector, Plug, 40 Pin, DT, DRC18-40SAE

#20 Contacts



Connector, Receptacle, 40 Pin, DRC



#16 Contacts

From Controller

40 Pin DRC Plug, # 20 Contacts

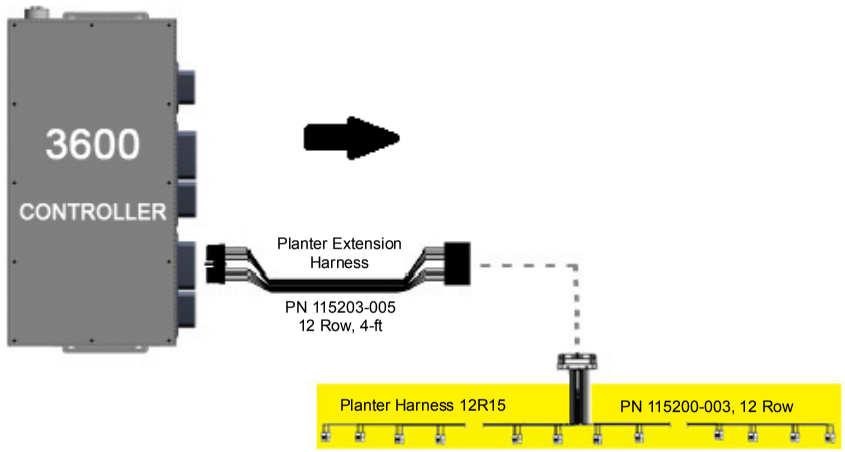
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Plug	Blue / White	Blue	Blue	Brown / White	Brown	Brown	Black / White	Black	Black	Plug	Pink / White	Pink	Pink	Violet / White	Violet	Violet	Orange / White	Orange	Orange	Plug	Green / White	Green	Green	Yellow / White	Yellow	Yellow	Red / White	Red	Red	Plug	Blue / White	Blue	Blue	Brown / White	Brown	Brown	Black / White	Black	Black

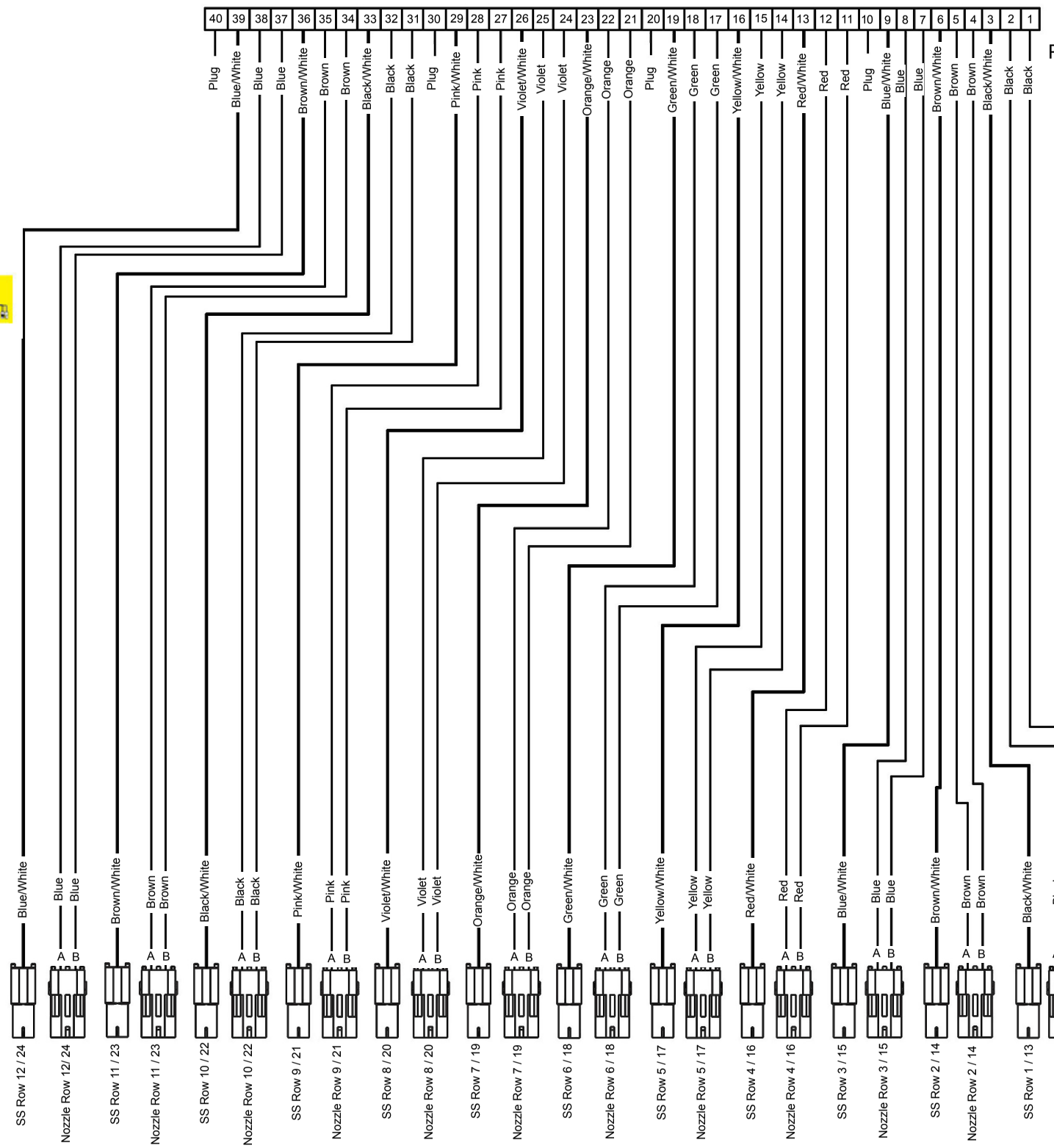
40 Pin DRC Receptacle, #16 Contacts

40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Plug	SS Row 12 / 24	Nozzle Row 24	Nozzle Row 12	SS Row 11 / 23	Nozzle Row 23	Nozzle Row 11	SS Row 10 / 22	Nozzle Row 22	Nozzle Row 10	Plug	SS Row 9 / 21	Nozzle Row 21	Nozzle Row 9	SS Row 8 / 20	Nozzle Row 20	Nozzle Row 8	SS Row 7 / 19	Nozzle Row 19	Nozzle Row 7	Plug	SS Row 6 / 18	Nozzle Row 18	Nozzle Row 6	SS Row 5/ 17	Nozzle Row 17	Nozzle Row 5	SS Row 4 / 16	Nozzle Row 16	Nozzle Row 4	Plug	SS Row 3 / 15	Nozzle Row 15	Nozzle Row 3	SS Row 2 / 14	Nozzle Row 14	Nozzle Row 2	SS Row 1 / 13	Nozzle Row 13	Nozzle Row 1

To Planter Harness

9.2 - Planter Harness, 12R15 with 4-FT Extension Harness

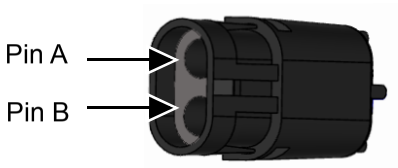




Connector, Plug, 40 Pin, DT, DRC18-40SAE

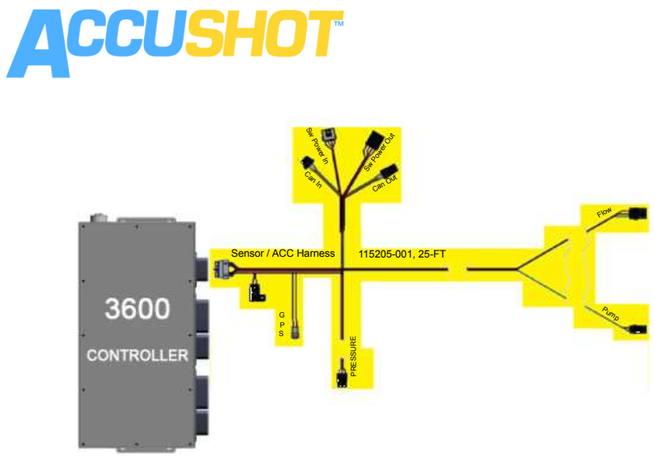
20 Contacts

2 Pin Connector Nozzle Valve Row



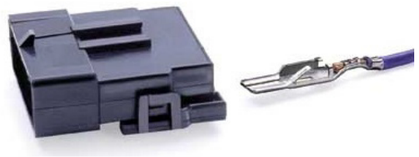
1 Pin Connector Seed Sensor Row

9.3 - Sensor and ACC Harness, 25-FT

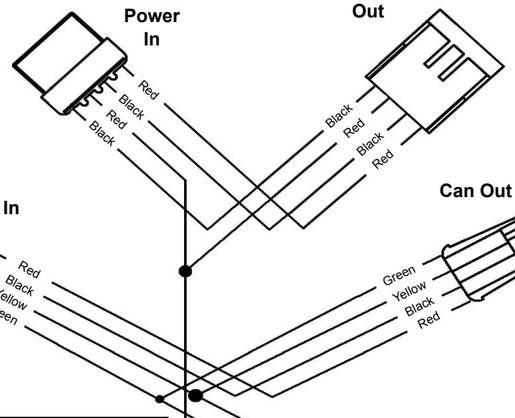


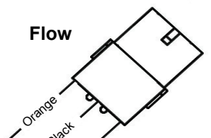
Connector, 24 Pin
DRC Series Size 20 B Key

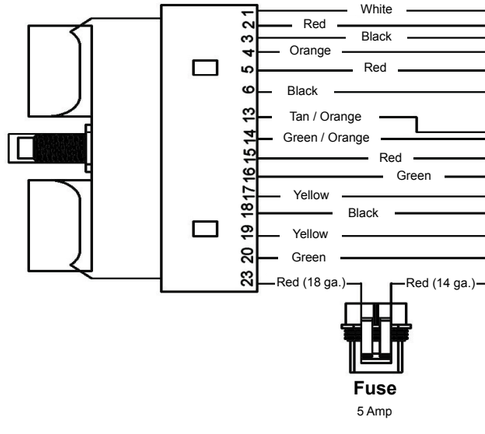
D=Black 10Ga.
C=Red 10Ga.
B= Black 10Ga.
A=Red 10Ga.

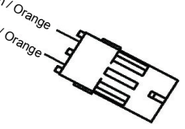


A=Red 10Ga.
B= Black 10Ga.
C=Red 10Ga.
D=Black 10Ga.



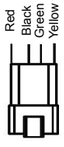




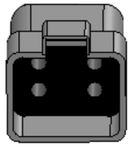


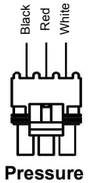
Pump

Fuse
5 Amp

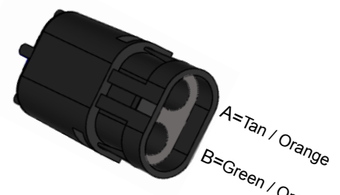


GPS



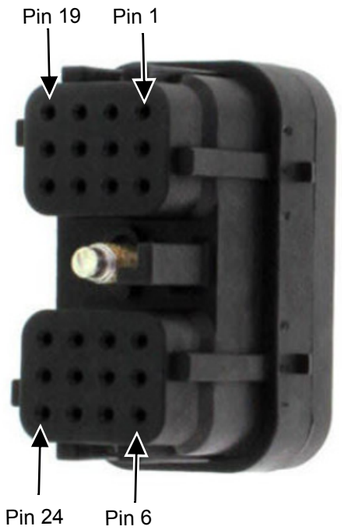


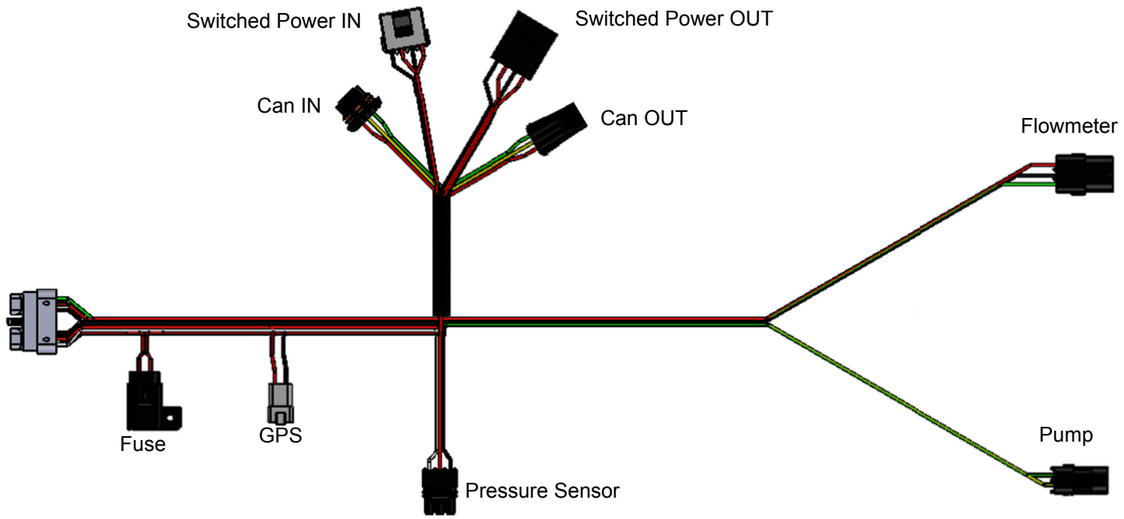
Pressure



9.3.1 - Sensor and ACC Harness, 25-FT

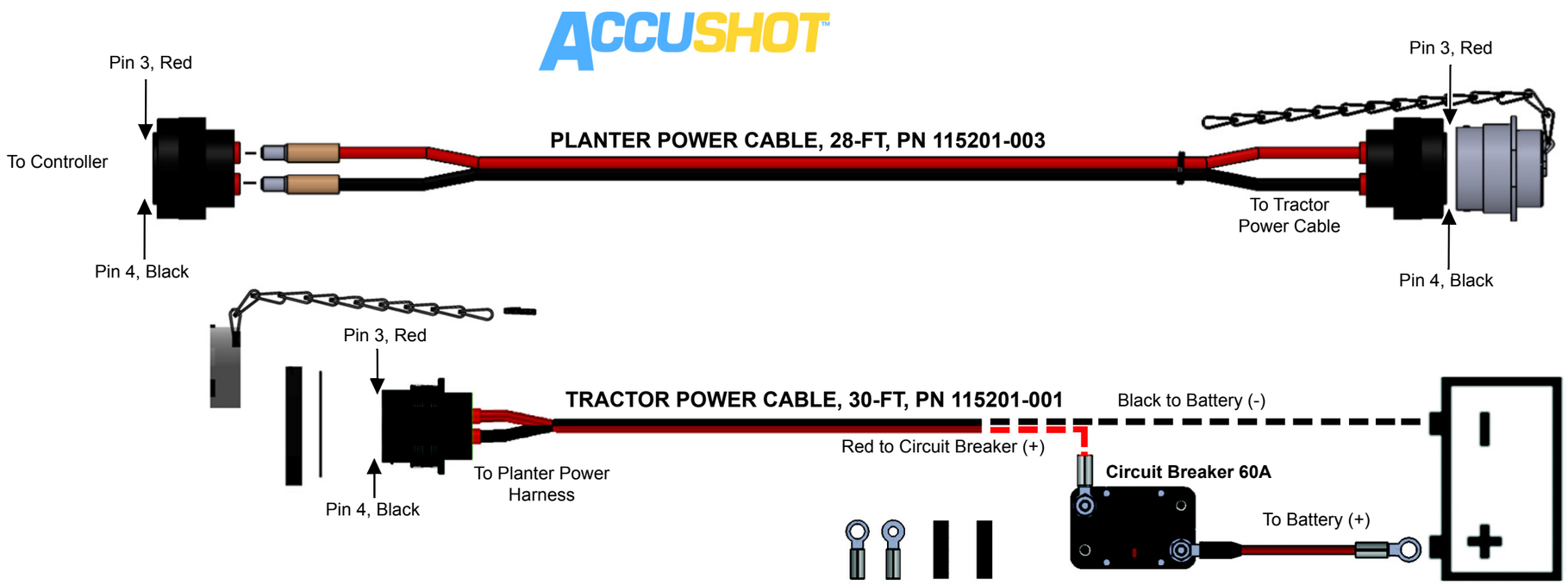
Connector, 24 Pin
DRC Series Size 20 B Key



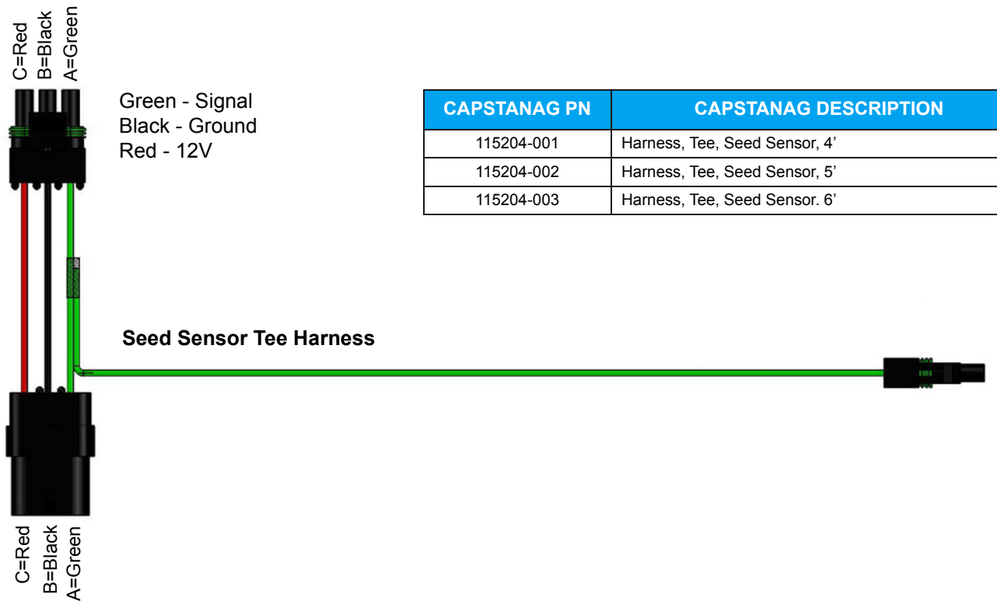


24 PIN	ITEM	WIRE DESCRIPTION	WIRE COLOR	WIRE LOCATION	CONNECTOR
Pin 1	Pressure Sensor	Signal 0.5 - 5V / 0 - 100 PSI	White	Pin A	WP Tower 3 Pin
Pin 2		12V	Red	Pin B	
Pin 3		Ground	Black	Pin C	
Pin 4	Flow Meter	Signal (Hz)	Orange	Pin C	WP Shroud 3 Pin
Pin 5		12V	Red	Pin B	
Pin 6		Ground	Black	Pin A	
Pin 7	Not Used				
Pin 8					
Pin 9					
Pin 10					
Pin 11					
Pin 12					
Pin 13	Pump Control	12V PWM	Tan / Orange	Pin A	WP Shroud 2 Pin
Pin 14			Green / Orange	Pin B	
Pin 15	GPS	5V	Red	Pin 1	DTM Receptacle 4 Pin
Pin 16		RS232 TX	Green	Pin 3	
Pin 17		RS232 RX	Yellow	Pin 4	
Pin 18		Ground	Black	Pin 2	
Pin 19	Can	ISO Can 1	Yellow	Pin E	MP 150 6 Pin
Pin 20		ISO Can 2	Green	Pin F	
Pin 21		Not Used			
Pin 22	Product 1	0V Product 1			
	Product 2	12V Product 2			
Pin 23	Switched Power In	12V	Red	Pin C	MP 630 4 Pin
Pin 24	Ground	Not Used			

9.4 - Planter Power Cable, 28-FT and Tractor Power Cable, 30-FT



9.5 - Seed Sensor Tee Harness



CAPSTANAG PN	CAPSTANAG DESCRIPTION
115204-001	Harness, Tee, Seed Sensor, 4’
115204-002	Harness, Tee, Seed Sensor, 5’
115204-003	Harness, Tee, Seed Sensor. 6’

THIS PAGE IS INTENTIONALLY LEFT BLANK

INDEX

T

V

W

Great Plains Ag

1935 E. North Street
Salina, Kansas 67401

www.greatplainsmfg.com

(800) 270-9302

CapstanAG

4225 S.W. Kirklawn Ave.
Topeka, Kansas 66609

www.capstanag.com

(855) 628-7722

115700-001 Rev. B